Fujitsu
PRIMERGY LX1430 M1, AMD EPYC 7232P, 3.10 GHz

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

Test Date: Jan-2020
Hardware Availability: Nov-2019
Software Availability: Aug-2019

SPECrate®2017_fp_base = 65.9
SPECrate®2017_fp_peak = Not Run

Hardware
CPU Name: AMD EPYC 7232P
Max MHz: 3200
Nominal: 3100
Enabled: 8 cores, 1 chip, 2 threads/core
Orderable: 1 chip
Cache L1: 32 KB I + 32 KB D on chip per core
L2: 512 KB I+D on chip per core
L3: 32 MB I+D on chip per chip, 8 MB shared / 2 cores
Other: None
Memory: 256 GB (8 x 32 GB 2Rx4 PC4-3200AA-L)
Storage: 1 x SATA HDD, 2TB, 7.2K RPM
Other: None

Software
OS: SUSE Linux Enterprise Server 15 SP1 (x86_64)
kernel version 4.12.14-195-default
Compiler: C/C++/Fortran: Version 2.0.0 of AOCC
Parallel: No
Firmware: Fujitsu BIOS Version R07. Released Nov-2019
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: Not Applicable
Power Management: BIOS set to prefer performance at the cost of additional power usage

<table>
<thead>
<tr>
<th>Benchmark</th>
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<tbody>
<tr>
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<td>16</td>
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<td>16</td>
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SPEC CPU®2017 Floating Point Rate Result
Copyright 2017-2020 Standard Performance Evaluation Corporation

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SPECrate®2017_fp_base = 65.9
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Results Table

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

Compiler Notes
The AMD64 AOCC Compiler Suite is available at http://developer.amd.com/amd-aocc/

Submit Notes
The config file option 'submit' was used. 'numactl' was used to bind copies to the cores. See the configuration file for details.

Operating System Notes
'ulimit -s unlimited' was used to set environment stack size
'ulimit -l 2097152' was used to set environment locked pages in memory limit
runcpu command invoked through numactl i.e.: numactl --interleave=all runcpu <etc>
Set dirty_ratio=8 to limit dirty cache to 8% of memory
Set swappiness=1 to swap only if necessary
Set zone_reclaim_mode=1 to free local node memory and avoid remote memory
sync then drop_caches=3 to reset caches before invoking runcpu

(Continued on next page)
### Fujitsu

**PRIMERGY LX1430 M1, AMD EPYC 7232P, 3.10 GHz**

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**Operating System Notes (Continued)**

Dirty_ratio, swappiness, zone_reclaim_mode and drop_caches were all set using privileged echo (e.g. echo 1 > /proc/sys/vm/swappiness).

Transparent huge pages set to 'always' for this run (OS default)

---

**Environment Variables Notes**

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

- **LD_LIBRARY_PATH** = 
  - 
  - 
- **MALLOC_CONF** = "retain:true"

---

**General Notes**

Binaries were compiled on a system with 2x AMD EPYC 7601 CPU + 512GB Memory using Fedora 26

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: configured and built with GCC v9.1.0 in Ubuntu 19.04 with -O3 -znver2 -flto
jemalloc 5.2.0 is available here:
https://github.com/jemalloc/jemalloc/releases/download/5.2.0/jemalloc-5.2.0.tar.bz2

---

**Platform Notes**

BIOS configuration:

- ACPI _CST C1 Declaration = Disabled
- cTDP = 200
- Determinism Slider = Power
- L2 Stream HW Prefetcher = Disabled
- NUMA nodes per socket = NPS2
- Package Power Limit = 200
- SMT Control = Auto
- SVM Mode = Disabled

Sysinfo program /home/Benchmark/speccpu2017/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edbl1e646a458a0011
running on linux-56yp Fri Jan 24 15:48:20 2020

---

*(Continued on next page)*
Platform Notes (Continued)

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 : AMD EPYC 7232P 8-Core Processor
  1 "physical id"s (chips)
  16 "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 : 8
siblings : 16
physical 0: cores 0 1 4 5 8 9 12 13

From lscpu:
Architecture:        x86_64
CPU op-mode(s):      32-bit, 64-bit
Byte Order:          Little Endian
Address sizes:       43 bits physical, 48 bits virtual
CPU(s):              16
On-line CPU(s) list: 0-15
Thread(s) per core:  2
Core(s) per socket:  8
Socket(s):           1
NUMA node(s):        1
Vendor ID:           AuthenticAMD
CPU family:          23
Model:               49
Model name:          AMD EPYC 7232P 8-Core Processor
Stepping:            0
CPU MHz:             3100.000
CPU max MHz:         3100.0000
CPU min MHz:         1500.0000
BogoMIPS:            6200.29
Virtualization:      AMD-V
L1d cache:           32K
L1i cache:           32K
L2 cache:            512K
L3 cache:            8192K
NUMA node0 CPU(s):   0-15
Flags:               fpu vme de pse tsc msr pae mce cmov cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx mmxext fxsr_opt pdpe1gb rdtscp lm
constant_tsc rep_good nopl xtopology nonstop_tsc cpuid extd_apicid aperfmperf pni
pclmulqdq monitor ssse3 fma cx16 sse4_1 sse4_2 movbe popcnt aes xsave avx f16c
rdrand lahf_lm cmp_legacy svm extiapic cr8_legacy abm sse4a misalignsse 3dnowprefetch
osvw ibs skinit wdt tce topoext perfctr_core perfctr_nb bpext perfctr_l2 mwaitx cpb

(Continued on next page)
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**Platform Notes (Continued)**

cat_l3 cdp_l3 hw_pstate sme ssbd sev ibrs ibpb stibp vmcall fsqgsbase bmi1 avx2 smep bmi2 cqmm rt_d_a rdseed adx smap cldhushopt clwb shaKi xsaveopt xsavem xgetbv1 xsavees cmm_llc cmm_occup_llc cmm_mbm_total cmm_mbm_local clzero irperf xsavemap ptr arat npt llbrv svm_lock nrip_save tsc_scale mmc_clean decodeassists pausefilter pfthreshold avic v_vmsave_vmload vgif umip rdpid overflow_recov succor smca

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cat_l3 cdp_l3 hw_pstate sme ssbd sev ibrs ibpb stibp vmcall fsqgsbase bmi1 avx2 smep bmi2 cqmm rt_d_a rdseed adx smap cldhushopt clwb shaKi xsaveopt xsavem xgetbv1 xsavees cmm_llc cmm_occup_llc cmm_mbm_total cmm_mbm_local clzero irperf xsavemap ptr arat npt llbrv svm_lock nrip_save tsc_scale mmc_clean decodeassists pausefilter pfthreshold avic v_vmsave_vmload vgif umip rdpid overflow_recov succor smca
```

/proc/cpuinfo cache data
cache size : 512 KB

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a physical chip.
available: 1 nodes (0)
ode 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
device 0 size: 257514 MB
node 0 free: 256693 MB
node distances:
node 0
0: 10

From /proc/meminfo
MemTotal: 263694856 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

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

```
NAME="SLES"
VERSION="15-SP1"
VERSION_ID="15.1"
PRETTY_NAME="SUSE Linux Enterprise Server 15 SP1"
ID="sles"
ID_LIKE="suse"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:15:sp1"

uname -a:
Linux linux-56yp 4.12.14-195-default #1 SMP Tue May 7 10:55:11 UTC 2019 (8fba516)
x86_64 x86_64 x86_64 GNU/Linux
```

Kernel self-reported vulnerability status:

- 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: __user pointer sanitization

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

Fujitsu

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Platform Notes (Continued)

CVE-2017-5715 (Spectre variant 2):
Mitigation: Full AMD retpoline, IBPB: conditional, IBRS_FW, STIBP: conditional, RSB filling

run-level 3 Feb 14 23:22

SPEC is set to: /home/Benchmark/speccpu2017
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda3 xfs 1.6T 15G 1.6T 1% /home

From /sys/devices/virtual/dmi/id
BIOS: GIGABYTE R07 08/30/2019
Vendor: GIGABYTE
Product: R152-231-FJ
Product Family: Server
Serial: GJI7P5821A0005

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:
8x Samsung M393A4K40DB3-CWE 32 kB 2 rank 3200
8x Unknown Unknown

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
C | 519.1bm_r(base) 538.imagick_r(base) 544.nab_r(base)
==============================================================================
AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins
AOCC_2_0_0-Build#191) (based on LLVM AOCC.LLVM.2.0.0.B191.2019_07_19)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin

==============================================================================
C++ | 508.namd_r(base) 510.parest_r(base)
==============================================================================
AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins
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(Continued on next page)
Compiler Version Notes (Continued)

InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin

C++, C          | 511.povray_r(base) 526.blender_r(base)
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Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin

C++, C, Fortran | 507.cactuBSSN_r(base)
AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins
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Fortran         | 503.bwaves_r(base) 549.fotonik3d_r(base) 554.roms_r(base)
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AOCC_2_0_0-Build#191) (based on LLVM AOCC.LLVM.2.0.0.B191.2019_07_19)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin
AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins
AOCC_2_0_0-Build#191) (based on LLVM AOCC.LLVM.2.0.0.B191.2019_07_19)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin

(Continued on next page)
Compiler Version Notes (Continued)

Fortran, C | 521.wrf_r(base) 527.cam4_r(base)
-------------------------------------------------------------------------------
AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins
   AOCC_2_0_0-Build#191) (based on LLVM AOCC.LLVM.2.0.0.B191.2019_07_19)
Target: x86_64-unknown-linux-gnu
Thread model: posix
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Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin
-------------------------------------------------------------------------------

Base Compiler Invocation

C benchmarks:
clang

C++ benchmarks:
clang++

Fortran benchmarks:
flang

Benchmarks using both Fortran and C:
flang clang

Benchmarks using both C and C++:
clang++ clang

Benchmarks using Fortran, C, and C++:
clang++ clang flang

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
SPEC CPU®2017 Floating Point Rate Result

Fujitsu

PRIMERGY LX1430 M1, AMD EPYC 7232P, 3.10 GHz

SPECraté®2017_fp_base = 65.9
SPECraté®2017_fp_peak = Not Run

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

Test Date: Jan-2020
Hardware Availability: Nov-2019
Software Availability: Aug-2019

Base Portability Flags (Continued)

519.lbm_r: -DSPEC_LP64
521.wrf_r: -DSPEC_CASE_FLAG -Mbyteswapio -DSPEC_LP64
526.blender_r: -funnsunset-char -D__BOOL_DEFINED -DSPEC_LP64
527.cam4_r: -DSPEC_CASE_FLAG -DSPEC_LP64
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:
-flto -Wl,-mlllvm -Wl,-function-specialize
-Wl,-mlllvm -Wl,-region-vectorize -Wl,-mlllvm -Wl,-vector-library=LIBMVEC
-Wl,-mlllvm -Wl,-reduce-array-computations=3 -O3 -ffast-math
-march=znver2 -fstruct-layout=3 -mlllvm -unroll-threshold=50
-fremap-arrays -mlllvm -function-specialize -mlllvm -enable-gvn-hoist
-mlllvm -reduce-array-computations=3 -mlllvm -global-vectorize-slp
-mlllvm -vector-library=LIBMVEC -mlllvm -inline-threshold=1000
-ffly-function-specialization -z muldefs -lmvec -lamdlibm -ljemalloc
-ilflang

C++ benchmarks:
-std=c++98 -flto -Wl,-mlllvm -Wl,-function-specialize
-Wl,-mlllvm -Wl,-region-vectorize -Wl,-mlllvm -Wl,-vector-library=LIBMVEC
-Wl,-mlllvm -Wl,-reduce-array-computations=3
-Wl,-mlllvm -Wl,-suppress-fmas -O3 -ffast-math -march=znver2
-mlllvm -loop-unswitch-threshold=200000 -mlllvm -vector-library=LIBMVEC
-mlllvm -unroll-threshold=100 -flv-function-specialization
-mlllvm -enable-partial-unswitch -z muldefs -lmvec -lamdlibm
-ljemalloc -ilflang

Fortran benchmarks:
-flto -Wl,-mlllvm -Wl,-function-specialize
-Wl,-mlllvm -Wl,-region-vectorize -Wl,-mlllvm -Wl,-vector-library=LIBMVEC
-Wl,-mlllvm -Wl,-reduce-array-computations=3 -O3 -march=znver2
-funroll-loops -Mrecursive -mlllvm -vector-library=LIBMVEC -z muldefs
-Kieee -fno-finite-math-only -lmvec -lamdlibm -ljemalloc -ilflang

Benchmarks using both Fortran and C:
-flto -Wl,-mlllvm -Wl,-function-specialize
-Wl,-mlllvm -Wl,-region-vectorize -Wl,-mlllvm -Wl,-vector-library=LIBMVEC
-Wl,-mlllvm -Wl,-reduce-array-computations=3 -O3 -ffast-math
-march=znver2 -fstruct-layout=3 -mlllvm -unroll-threshold=50

(Continued on next page)
### Fujitsu

**PRIMERGY LX1430 M1, AMD EPYC 7232P, 3.10 GHz**

**SPECraté®2017_fp_base = 65.9**

**SPECraté®2017_fp_peak = Not Run**

<table>
<thead>
<tr>
<th>CPU2017 License</th>
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<tr>
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<td>Jan-2020</td>
<td>Nov-2019</td>
</tr>
</tbody>
</table>

**Test Sponsor:** Fujitsu  
**Tested by:** Fujitsu

#### Base Optimization Flags (Continued)

**Benchmarks using both Fortran and C (continued):**
- `-fremap-arrays -mllvm -function-specialize -mllvm -enable-gvn-hoist`
- `-mllvm -reduce-array-computations=3 -mllvm -global-vectorize-slp`
- `-mllvm -vector-library=LIBMVEC -mllvm -inline-threshold=1000`
- `-flv-function-specialization -funroll-loops -Mrecursive -z muldefs`
- `-Kieee -fno-finite-math-only -lmvec -lamdlibm -ljemalloc -lflang`

**Benchmarks using both C and C++:**
- `-std=c++98 -flto -Wl,-mllvm -Wl,-function-specialize`
- `-Wl,-mllvm -Wl,-region-vectorize -Wl,-mllvm -Wl,-vector-library=LIBMVEC`
- `-Wl,-mllvm -Wl,-reduce-array-computations=3`
- `-Wl,-mllvm -Wl,-suppress-fmas -O3 -ffast-math -march=znver2`
- `-fstruct-layout=3 -mllvm -unroll-threshold=50 -fremap-arrays`
- `-mllvm -function-specialize -mllvm -enable-gvn-hoist`
- `-mllvm -reduce-array-computations=3 -mllvm -global-vectorize-slp`
- `-mllvm -vector-library=LIBMVEC -mllvm -inline-threshold=1000`
- `-flv-function-specialization -mllvm -loop-unswitch-threshold=200000`
- `-mllvm -unroll-threshold=100 -mllvm -enable-partial-unswitch -z muldefs`
- `-lmvec -lamdlibm -ljemalloc -lflang`

**Benchmarks using Fortran, C, and C++:**
- `-std=c++98 -flto -Wl,-mllvm -Wl,-function-specialize`
- `-Wl,-mllvm -Wl,-region-vectorize -Wl,-mllvm -Wl,-vector-library=LIBMVEC`
- `-Wl,-mllvm -Wl,-reduce-array-computations=3`
- `-Wl,-mllvm -Wl,-suppress-fmas -O3 -ffast-math -march=znver2`
- `-fstruct-layout=3 -mllvm -unroll-threshold=50 -fremap-arrays`
- `-mllvm -function-specialize -mllvm -enable-gvn-hoist`
- `-mllvm -reduce-array-computations=3 -mllvm -global-vectorize-slp`
- `-mllvm -vector-library=LIBMVEC -mllvm -inline-threshold=1000`
- `-flv-function-specialization -mllvm -loop-unswitch-threshold=200000`
- `-mllvm -unroll-threshold=100 -mllvm -enable-partial-unswitch`
- `-funroll-loops -Mrecursive -z muldefs -Kieee -fno-finite-math-only -lmvec -lamdlibm -ljemalloc -lflang`

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:


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Page 10 | Standard Performance Evaluation Corporation (info@spec.org) | https://www.spec.org/
### SPEC CPU®2017 Floating Point Rate Result

**Fujitsu**

PRIMERGY LX1430 M1, AMD EPYC 7232P, 3.10 GHz

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