Lenovo Global Technology
ThinkSystem SR645 V3
(4.10 GHz, AMD EPYC 9174F)

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<table>
<thead>
<tr>
<th>Threads</th>
<th>603.bwaves_s 32</th>
<th>607.cactuBSSN_s 32</th>
<th>619.lbm_s 32</th>
<th>621.wrf_s 32</th>
<th>627.cam4_s 32</th>
<th>628.pop2_s 32</th>
<th>638.imagick_s 32</th>
<th>644.nab_s 32</th>
<th>649.fotonik3d_s 32</th>
<th>654.roms_s 32</th>
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</tbody>
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**Hardware**

- **CPU Name:** AMD EPYC 9174F
- **Max MHz:** 4400
- **Nominal:** 4100
- **Enabled:** 32 cores, 2 chips
- **Orderable:** 1.2 chips
- **Cache L1:** 32 KB I + 32 KB D on chip per core
- **L2:** 1 MB I+D on chip per core
- **L3:** 256 MB I+D on chip per chip, 32 MB shared / 2 cores
- **Other:** None
- **Memory:** 1536 GB (24 x 64 GB 2Rx4 PC5-4800B-R)
- **Storage:** 1 x 480 GB SATA SSD
- **Other:** None

**Software**

- **OS:** SUSE Linux Enterprise Server 15 SP4 (x86_64)
- **Compiler:** C/C++/Fortran: Version 4.0.0 of AOCC
- **Parallel:** Yes
- **Firmware:** Lenovo BIOS Version KAE105L 1.20 released Dec-2022
- **File System:** xfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** 64-bit
- **Other:** None
- **Power Management:** BIOS and OS set to prefer performance at the cost of additional power usage
## Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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</tbody>
</table>

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

## Compiler Notes

The AMD64AOCC 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 limit
'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>

To limit dirty cache to 8% of memory, 'sysctl -w vm.dirty_ratio=8' run as root.
To limit swap usage to minimum necessary, 'sysctl -w vm.swappiness=1' run as root.
To free node-local memory and avoid remote memory usage, 'sysctl -w vm.zone_reclaim_mode=1' run as root.
To clear filesystem caches, 'sync; sysctl -w vm.drop_caches=3' run as root.
To disable address space layout randomization (ASLR) to reduce run-to-run variability, 'sysctl -w kernel.randomize_va_space=0' run as root.

To enable Transparent Hugepages (THP) for all allocations,
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(4.10 GHz, AMD EPYC 9174F)

Environment Variables Notes

Environment variables set by runcpu before the start of the run:
GOMP_CPU_AFFINITY = "0-31"
LD_LIBRARY_PATH = 
"/home/cpu2017-1.1.8-amd-aocc400-genoa-B1b/amd_speed_aocc400_genoa_B_lib
/lib;"
LIBOMP_NUM_HIDDEN_HELPER_THREADS = "0"
MALLOCD_CONF = "oversize_threshold:0,retain:true"
OMP_DYNAMIC = "false"
OMP_SCHEDULE = "static"
OMP_STACKSIZE = "128M"
OMP_THREAD_LIMIT = "32"

Environment variables set by runcpu during the 603.bwaves_s peak run:
GOMP_CPU_AFFINITY = "0-31"

Environment variables set by runcpu during the 607.cactuBSSN_s peak run:
GOMP_CPU_AFFINITY = "0-31"

Environment variables set by runcpu during the 619.lbm_s peak run:
GOMP_CPU_AFFINITY = "0-31"

Environment variables set by runcpu during the 621.wrf_s peak run:
GOMP_CPU_AFFINITY = "0-31"

Environment variables set by runcpu during the 627.cam4_s peak run:
GOMP_CPU_AFFINITY = "0-31"

Environment variables set by runcpu during the 628.pop2_s peak run:
GOMP_CPU_AFFINITY = "0-31"

Environment variables set by runcpu during the 638.imagick_s peak run:
(Continued on next page)
Lenovo Global Technology
ThinkSystem SR645 V3
(4.10 GHz, AMD EPYC 9174F)

SPECspeed®2017_fp_base = 272
SPECspeed®2017_fp_peak = 278

Environment Variables Notes (Continued)

GOMP_CPU_AFFINITY = "0-31"

Environment variables set by runcpu during the 654.roms_s peak run:
GOMP_CPU_AFFINITY = "0 16 1 17 2 18 3 19 4 20 5 21 6 22 7 23 8 24 9 25 10 26 11 27 12 28 13 29 14 30 15 31"

General Notes

Binaries were compiled on a system with 2x AMD EPYC 9174F CPU + 1.5TiB Memory using RHEL 8.6

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.

Platform Notes

BIOS configuration:
Operating Mode set to Maximum Performance
SMT Mode set to Disabled

Sysinfo program /home/cpu2017-1.1.8-amd-aocc400-genoa-B1b/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16aaca6f64d
running on localhost Wed Jan 25 10:44:24 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 : AMD EPYC 9174F 16-Core Processor
  2 "physical id"s (chips)
  32 "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 : 16
  siblings : 16
physical 0: cores 0 1 16 17 32 33 48 49 64 65 80 81 96 97 112 113
physical 1: cores 0 1 16 17 32 33 48 49 64 65 80 81 96 97 112 113

From lscpu from util-linux 2.37.2:
  Architecture: x86_64

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

**Lenovo Global Technology**

**ThinkSystem SR645 V3**

(4.10 GHz, AMD EPYC 9174F)

SPECspeed®2017_fp_base = 272

SPECspeed®2017_fp_peak = 278

---

**Platform Notes (Continued)**

- **CPU op-mode(s):** 32-bit, 64-bit
- **Address sizes:** 52 bits physical, 57 bits virtual
- **Byte Order:** Little Endian
- **CPU(s):** 32
- **On-line CPU(s) list:** 0-31
- **Vendor ID:** AuthenticAMD
- **Model name:** AMD EPYC 9174F 16-Core Processor
- **CPU family:** 25
- **Model:** 17
- **Thread(s) per core:** 1
- **Core(s) per socket:** 16
- **Socket(s):** 2
- **Stepping:** 1
- **Frequency boost:** enabled
- **CPU max MHz:** 4408.2998
- **CPU min MHz:** 1500.0000
- **BogoMIPS:** 8187.25
- **Flags:** fpu vme de pse tsc msr pae mce 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 nonstop_tsc cpuid extd_apicid aperfpmr perf rapl pni pclmulqdq monitor ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic movbe popcnt aes xsave avx f16c rdrand lahf_lm cmp_legacy svm extapic cr8_legacy abm sse4a misalignsse 3dnowprefetch osvw ibrx skinit wdt tce topoext perfctr_core perfctr_nb bptext perfctr_l1d mwaitx cpb cat_l3 cdp_l3 invpcid_single hw_pstate ssbd mba ibrs ibpb stibp vmmcall fsq节能 base bni avx2 smep bni2 erms invpcid crq rdt_a avx512f avx512dq rdseed adv smap avx512ifma clflushopt clwb avx512cd sha ni avx512bw avx512vl xsaveopt xsave xsaveopt xgetbv1 xsaves cmqm_llc cmqm_occup_llc cmqm_mb_total cmqm_mb_local avx512_bf16 clzern rperf xsaveerptr rdpru wbnoinvd amd_pppn arat npt lbv svm_lock rnp_save tsc_scale vmcb_clean flushbyasid decodeassists pausefilter pthreshold avic v_vmsave_vmload vgif v_spec_ctrl avx512vbm imip pku ospe avx512_vbmi2 gfn vaes vpcmulqtd avx512_vnmi avx512_bitalg avx512_vpopcntdq la57 rdpid overflow_recover succor smca frrm flush_lld
- **Virtualization:** AMD-V
- **L1d cache:** 1 MiB (32 instances)
- **L1i cache:** 1 MiB (32 instances)
- **L2 cache:** 32 MiB (32 instances)
- **L3 cache:** 512 MiB (16 instances)
- **NUMA node(s):** 2
- **NUMA node0 CPU(s):** 0-15
- **NUMA node1 CPU(s):** 16-31
- **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/swapgs barriers and __user

(Continued on next page)

---

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology
Test Date: Jan-2023
Hardware Availability: Feb-2023
Software Availability: Nov-2022
Lenovo Global Technology
ThinkSystem SR645 V3
(4.10 GHz, AMD EPYC 9174F)

SPECspeed®2017_fp_base = 272
SPECspeed®2017_fp_peak = 278

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Test Date: Jan-2023
Hardware Availability: Feb-2023
Tested by: Lenovo Global Technology
Software Availability: Nov-2022

Platform Notes (Continued)

pointer sanitization
Vulnerability Spectre v2: Mitigation; Retpolines, IBPB conditional, IBRS_FW, STIBP disabled, RSB filling
Vulnerability Srbdos: Not affected
Vulnerability Txs async abort: Not affected

From lscpu --cache:
NAME ONE-SIZE ALL-SIZE WAYS TYPE LEVEL SETS PHY-LINE COHERENCY-SIZE
L1d 32K 1M 8 Data 1 64 1 64
L1i 32K 1M 8 Instruction 1 64 1 64
L2 1M 32M 8 Unified 2 2048 1 64
L3 32M 512M 16 Unified 3 32768 1 64

/proc/cpuinfo cache data
  cache size: 1024 KB

From numactl --hardware
WARNING: a numactl 'node' might or might not correspond to a physical chip.
available: 2 nodes (0-1)
node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
node 0 size: 773833 MB
node 0 free: 772038 MB
node 1 cpus: 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
node 1 size: 773847 MB
node 1 free: 773338 MB
node distances:
  node   0   1
  0: 10 32
  1: 32 10

From /proc/meminfo
  MemTotal: 1584825932 kB
  HugePages_Total: 0
  Hugepagesize: 2048 kB

/sys/devices/system/cpu/cpu*/cpufreq/scaling_governor has performance

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"

(Continued on next page)
Platform Notes (Continued)

```c
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) 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
- **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: Retpolines, IBPB: conditional, IBRS_FW, STIBP: disabled, RSB filling
- **CVE-2020-0543 (Special Register Buffer Data Sampling):** Not affected
- **CVE-2019-11135 (TSX Asynchronous Abort):** Not affected

```
runtime 3 Jan 25 10:41
```

```
SPEC is set to: /home/cpu2017-1.1.8-amd-aocc400-genoa-B1b
```

```
Filesystem     Type  Size  Used Avail Use% Mounted on
/dev/sdb3      xfs   442G   23G  419G   6% /
```

From /sys/devices/virtual/dmi/id
```
Vendor:       Lenovo
Product:      ThinkSystem SR645 V3 MB,Genoa,DDR5,Oahu,1U
Product Family: ThinkSystem
Serial: 1234567890
```

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:
  21x SK Hynix HMCG94AEBRA102N 64 GB 2 rank 4800
  2x SK Hynix HMCG94AEBRA109N 64 GB 2 rank 4800
  1x Samsung M321R8GA0BB0-CQKD G 64 GB 2 rank 4800
```

```
BIOS:
  BIOS Vendor: Lenovo
```

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR645 V3
(4.10 GHz, AMD EPYC 9174F)

SPECspeed®2017_fp_base = 272
SPECspeed®2017_fp_peak = 278

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology

Platform Notes (Continued)

- BIOS Version: KAE105L-1.20
- BIOS Date: 12/29/2022
- BIOS Revision: 1.20
- Firmware Revision: 1.20

(End of data from sysinfo program)

Compiler Version Notes

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

---

AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#389 2022_10_07) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin

---

C++, C, Fortran
| 607.cactuBSSN_s(base, peak) |

---

AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#389 2022_10_07) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#389 2022_10_07) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#389 2022_10_07) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin

---

Fortran
| 603.bwaves_s(base, peak) 649.fotonik3d_s(base, peak) 654.roms_s(base, peak) |

---

AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#389 2022_10_07) (based on LLVM Mirror.Version.14.0.6)

(Continued on next page)
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(4.10 GHz, AMD EPYC 9174F)

**SPEC CPU®2017 Floating Point Speed Result**

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### Lenovo Global Technology
ThinkSystem SR645 V3
(4.10 GHz, AMD EPYC 9174F)

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**CPU2017 License:** 9017  
**Test Date:** Jan-2023  
**Test Sponsor:** Lenovo Global Technology  
**Hardware Availability:** Feb-2023  
**Software Availability:** Nov-2022

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**Compiler Version Notes (Continued)**

- **Target:** x86_64-unknown-linux-gnu  
- **Thread model:** posix  
- **InstalledDir:** /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin

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**Fortran, C**

| 621.wrf_s(base, peak) 627.cam4_s(base, peak) 628.pop2_s(base, peak) |

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**AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#389 2022_10_07)** (based on LLVM Mirror.Version.14.0.6)

**Target:** x86_64-unknown-linux-gnu  
**Thread model:** posix  
**InstalledDir:** /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin

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**Base Compiler Invocation**

**C benchmarks:**

- clang

**Fortran benchmarks:**

- flang

**Benchmarks using both Fortran and C:**

- flang clang

**Benchmarks using Fortran, C, and C++:**

- clang++ clang flang

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**Base Portability Flags**

- 603.bwaves_s: -DSPEC_LP64
- 607.cactuBSSN_s: -DSPEC_LP64
- 619.lbm_s: -DSPEC_LP64
- 621.wrf_s: -DSPEC_CASE_FLAG -Mbytswapio -DSPEC_LP64
- 627.cam4_s: -DSPEC_CASE_FLAG -DSPEC_LP64
- 628.pop2_s: -DSPEC_CASE_FLAG -Mbytswapio -DSPEC_LP64

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### Base Portability Flags (Continued)

- 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 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6`
- `-Wl,-mllvm -Wl,-reduce-array-computations=3 -O3 -march=znver4`
- `-fveclib=AMDLIBM -ffast-math -fopenmp -ftlo -fstruct-layout=7`
- `-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000`
- `-freemap-arrays -fstrip-mining -mllvm -reduce-array-computations=3`
- `-DSPEC_OPENMP -zopt -fopenmp=libomp -lomp -lamdlibm -lamdaloc -lflang`

#### Fortran benchmarks:
- `-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6`
- `-Wl,-mllvm -Wl,-reduce-array-computations=3`
- `-Wl,-mllvm -Wl,-enable-X86-prefetching -DSPEC_OPENMP -O3 -march=znver4`
- `-fveclib=AMDLIBM -ffast-math -fopenmp -ftlo -Mrecursive`
- `-funroll-loops -mllvm -lsr-in-nested-loop`
- `-mllvm -reduce-array-computations=3 -zopt -fopenmp=libomp -lomp`
- `-lamdlibm -lamdaloc -lflang`

#### Benchmarks using both Fortran and C:
- `-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6`
- `-Wl,-mllvm -Wl,-reduce-array-computations=3`
- `-Wl,-mllvm -Wl,-enable-X86-prefetching -O3 -march=znver4`
- `-fveclib=AMDLIBM -ffast-math -fopenmp -ftlo -fstruct-layout=7`
- `-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000`
- `-freemap-arrays -fstrip-mining -mllvm -reduce-array-computations=3`
- `-DSPEC_OPENMP -zopt -Mrecursive -funroll-loops`
- `-mllvm -lsr-in-nested-loop -fopenmp=libomp -lomp -lamdlibm -lamdaloc -lflang`

#### Benchmarks using Fortran, C, and C++:
- `-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6`
- `-Wl,-mllvm -Wl,-reduce-array-computations=3`
- `-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -O3 -march=znver4`
- `-fveclib=AMDLIBM -ffast-math -fopenmp -ftlo -fstruct-layout=7`
- `-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000`
- `-freemap-arrays -fstrip-mining -mllvm -reduce-array-computations=3`
- `-DSPEC_OPENMP -zopt -mllvm -unroll-threshold=100 -finline-aggressive`

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## Base Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++ (continued):
- `mllvm -loop-unswitch-threshold=200000 -Mrecursive -funroll-loops`
- `mllvm -lsr-in-nested-loop -fopenmp=libomp -lomp -lamdlibm -lamdalloc`
- `-lflang`

## Base Other Flags

C benchmarks:
- `-Wno-return-type` `-Wno-unused-command-line-argument`

Fortran benchmarks:
- `-Wno-unused-command-line-argument`

Benchmarks using both Fortran and C:
- `-Wno-return-type` `-Wno-unused-command-line-argument`

Benchmarks using Fortran, C, and C++:
- `-Wno-return-type` `-Wno-unused-command-line-argument`

## Peak Compiler Invocation

C benchmarks:
- `clang`

Fortran benchmarks:
- `flang`

Benchmarks using both Fortran and C:
- `flang clang`

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

## Peak Portability Flags

Same as Base Portability Flags
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Peak Optimization Flags

C benchmarks:

- 619.lbm_s: -m64 -Wl,-mllvm -Wl, -align-all-nofallthru-blocks=6
- Wl, -mllvm -Wl, -reduce-array-computations=3 -Ofast
- -march=znver4 -fveclib=AMDLIBM -ffast-math -fopenmp
- -ftio -fstruct-layout=9 -mllvm -unroll-threshold=50
- -mllvm -inline-threshold=1000
- -mllvm -reduce-array-computations=3 -DSPEC_OPENMP -zopt
- -fopenmp=libomp -lomp -lamdlibm -lamdalloc -lflang

- 638.imagick_s: Same as 619.lbm_s

- 644.nab_s: basepeak = yes

Fortran benchmarks:

- 603.bwaves_s: -m64 -Wl,-mllvm -Wl, -align-all-nofallthru-blocks=6
- Wl, -mllvm -Wl, -reduce-array-computations=3
- Wl, -mllvm -Wl, -enable-X86-prefetching -DSPEC_OPENMP
- -Ofast -march=znver4 -fveclib=AMDLIBM -ffast-math
- -fopenmp -Mrecursive -mllvm -reduce-array-computations=3
- -fvector-transform -fscalar-transform -fopenmp=libomp
- -lomp -lamdlibm -lamdalloc -lflang

- 649.fotonik3d_s: basepeak = yes

- 654.roms_s: Same as 603.bwaves_s

Benchmarks using both Fortran and C:

- 621.wrf_s: -m64 -Wl,-mllvm -Wl, -align-all-nofallthru-blocks=6
- Wl, -mllvm -Wl, -reduce-array-computations=3
- Wl, -mllvm -Wl, -enable-X86-prefetching -Ofast
- -march=znver4 -fveclib=AMDLIBM -ffast-math -fopenmp
- -ftio -fstruct-layout=9 -mllvm -unroll-threshold=50
- -mllvm -inline-threshold=1000
- -mllvm -reduce-array-computations=3 -DSPEC_OPENMP -zopt
- -Mrecursive -funroll-loops -mllvm -lsr-in-nested-loop
- -fopenmp=libomp -lomp -lamdlibm -lamdalloc -lflang

- 627.cam4_s: -m64 -Wl,-mllvm -Wl, -align-all-nofallthru-blocks=6
- Wl, -mllvm -Wl, -reduce-array-computations=3
- Wl, -mllvm -Wl, -enable-X86-prefetching -Ofast
- -march=znver4 -fveclib=AMDLIBM -ffast-math -fopenmp

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Peak Optimization Flags (Continued)

627.cam4_s (continued):
-fito -fstruct-layout=9 -mllvm -unroll-threshold=50
-fremap-arrays -fstrip-mining
-mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3 -DSPEC_OPENMP -zopt
-Mrecursive -fopenmp=libomp -lomp -lamdlibm -lamdalloc
-llflang

628.pop2_s: -m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-enable-X86-prefetching -Ofast
-march=znver4 -fveclib=AMDLIBM -ffast-math -fopenmp
-fito -fstruct-layout=9 -mllvm -unroll-threshold=50
-fremap-arrays -fstrip-mining
-mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3 -DSPEC_OPENMP -zopt
-Mrecursive -fvector-transform -fscalar-transform
-fopenmp=libomp -lomp -lamdlibm -lamdalloc -llflang

Benchmarks using Fortran, C, and C++:
-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -Ofast -march=znver4
-fveclib=AMDLIBM -ffast-math -fopenmp -fito -fstruct-layout=9
-mllvm -unroll-threshold=50 -fremap-arrays -fstrip-mining
-mllvm -inline-threshold=1000 -mllvm -reduce-array-computations=3
-DSPEC_OPENMP -zopt -finline-aggressive -mllvm -unroll-threshold=100
-Mrecursive -fopenmp=libomp -lomp -lamdlibm -lamdalloc -llflang

Peak Other Flags

C benchmarks:
- Wno-return-type -Wno-unused-command-line-argument

Fortran benchmarks:
- Wno-unused-command-line-argument

Benchmarks using both Fortran and C:
- Wno-return-type -Wno-unused-command-line-argument

Benchmarks using Fortran, C, and C++:
- Wno-return-type -Wno-unused-command-line-argument
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The flags files that were used to format this result can be browsed at

http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-Genoa-Q.html

http://www.spec.org/cpu2017/flags/aocc400-flags.html

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

http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-Genoa-Q.xml

http://www.spec.org/cpu2017/flags/aocc400-flags.xml

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Tested with SPEC CPU®2017 v1.1.8 on 2023-01-24 21:44:24-0500.  
Report generated on 2023-02-15 10:38:29 by CPU2017 PDF formatter v6442.  
Originally published on 2023-02-14.