Supermicro
A+ Server 2124BT-HTR
(H12DST-B , AMD EPYC 7262)

CPU2017 License: 001176
Test Sponsor: Supermicro
Tested by: Supermicro

Threads

| SPECspeed®2017_int_base = 8.83 |
|------------------|------------------|
| SPECspeed®2017_int_peak = 9.02 |

CPU Name: AMD EPYC 7262
Max MHz: 3400
Nominal: 3200
Enabled: 16 cores, 2 chips, 2 threads/core
Orderable: 1.2 chips
Cache L1: 32 KB I + 32 KB D on chip per core
L2: 512 KB I+D on chip per core
L3: 128 MB I+D on chip per chip, 16 MB per core
Other: None
Memory: 512 GB (16 x 32 GB 2Rx4 PC4-3200AA-R)
Storage: 1 x 200 GB SATA III SSD
Other: None

OS: Ubuntu 19.04
Compiler: C/C++/Fortran: Version 2.0.0 of AOCC
Parallel: Yes
Firmware: Version 1.1 released Jan-2020
File System: ext4
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 32/64-bit
Other: jemalloc: jemalloc memory allocator library v5.1.0
Power Management: BIOS set to prefer performance at the cost of additional power usage.
**SPEC CPU®2017 Integer Speed Result**

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**Test Date:** Feb-2020  
**Hardware Availability:** Aug-2019  
**Software Availability:** Aug-2019

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### Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<tbody>
<tr>
<td>600.perlbench_s</td>
<td>16</td>
<td>364</td>
<td>4.88</td>
<td>364</td>
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<td>4.88</td>
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<td>602.gcc_s</td>
<td>16</td>
<td>426</td>
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<td>425</td>
<td>9.37</td>
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<td><strong>9.37</strong></td>
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<tr>
<td>605.mcf_s</td>
<td>16</td>
<td>314</td>
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<td><strong>15.0</strong></td>
<td>314</td>
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<tr>
<td>620.omnetpp_s</td>
<td>16</td>
<td>335</td>
<td>4.87</td>
<td>338</td>
<td>4.83</td>
<td><strong>338</strong></td>
<td><strong>4.83</strong></td>
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<tr>
<td>623.xalanchmk_s</td>
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<td><strong>150</strong></td>
<td><strong>9.46</strong></td>
<td>151</td>
<td>9.38</td>
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<td>9.50</td>
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<tr>
<td>625.x264_s</td>
<td>16</td>
<td>140</td>
<td>12.6</td>
<td>140</td>
<td>12.6</td>
<td>140</td>
<td>12.6</td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>16</td>
<td><strong>297</strong></td>
<td><strong>4.83</strong></td>
<td>298</td>
<td>4.81</td>
<td>294</td>
<td>4.87</td>
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<tr>
<td>641.leela_s</td>
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<td>397</td>
<td>4.30</td>
<td>396</td>
<td>4.30</td>
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<tr>
<td>648.exchange2_s</td>
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<td><strong>175</strong></td>
<td><strong>16.8</strong></td>
<td>175</td>
<td>16.8</td>
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<tr>
<td>657.xz_s</td>
<td>16</td>
<td>299</td>
<td>20.7</td>
<td>297</td>
<td>20.8</td>
<td><strong>297</strong></td>
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**SPECspeed®2017_int_base = 8.83**  
**SPECspeed®2017_int_peak = 9.02**

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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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### Compiler Notes

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

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### 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

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)
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SPEC CPU®2017 Integer Speed Result
Copyright 2017-2020 Standard Performance Evaluation Corporation

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Test Sponsor: Supermicro
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Hardware Availability: Aug-2019
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Environment Variables Notes

Environment variables set by runcpu before the start of the run:
GOMP_CPU_AFFINITY = "0-31"
LD_LIBRARY_PATH = "/home/cpu2017/amd_speed_aocc200_rome_C_lib/64;/home/cpu2017/amd_speed_aocc200_rome_C_lib/32:"
MALLOCONF = "retain:true"
OMP_DYNAMIC = "false"
OMP_SCHEDULE = "static"
OMP_STACKSIZE = "128M"
OMP_THREAD_LIMIT = "32"

Environment variables set by runcpu during the 600.perlbench_s peak run:
GOMP_CPU_AFFINITY = "0"

Environment variables set by runcpu during the 605.mcf_s peak run:
GOMP_CPU_AFFINITY = "0"

Environment variables set by runcpu during the 623.xalancbmk_s peak run:
GOMP_CPU_AFFINITY = "0"
OMP_STACKSIZE = "128M"

Environment variables set by runcpu during the 625.x264_s peak run:
GOMP_CPU_AFFINITY = "0"

Environment variables set by runcpu during the 631.deepsjeng_s peak run:
GOMP_CPU_AFFINITY = "0"

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 -03 -znver2 -flto
jemalloc 5.1.0 is available here:
https://github.com/jemalloc/jemalloc/releases/download/5.1.0/jemalloc-5.1.0.tar.bz2
# SPEC CPU®2017 Integer Speed Result

## Supermicro

A+ Server 2124BT-HTR (H12DST-B, AMD EPYC 7262)

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**CPU2017 License:** 001176  
**Test Sponsor:** Supermicro  
**Tested by:** Supermicro  
**Test Date:** Feb-2020  
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## Platform Notes

**BIOS Settings:**
- Determinism Control = Manual
- Determinism Slider = Power
- cTDP Control = Manual
- cTDP = 180
- Package Power Limit Control = Manual
- Package Power Limit = 180
- APBDIS = 1

Sysinfo program /home/cpu2017/bin/sysinfo  
Rev: r6365 of 2019-08-21 295195f888a3d7edbl6e46a485a0011  
running on h12dst-01 Sat Feb 22 01:25:09 2020

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 7262 8-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: 8
  - siblings: 16
  - physical 0: cores 0 4 8 12 16 20 24 28
  - physical 1: cores 0 4 8 12 16 20 24 28

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): 32
- On-line CPU(s) list: 0-31
- Thread(s) per core: 2
- Core(s) per socket: 8
- Socket(s): 2
- NUMA node(s): 2
- Vendor ID: AuthenticAMD
- CPU family: 23
- Model: 49
- Model name: AMD EPYC 7262 8-Core Processor
- Stepping: 0
- CPU MHz: 3400.128
- CPU max MHz: 3200.0000
- CPU min MHz: 1500.0000

(Continued on next page)
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**SPECspeed®2017_int_base = 8.83**

**SPECspeed®2017_int_peak = 9.02**

---

### Platform Notes (Continued)

- **BogoMIPS:** 6400.40
- **Virtualization:** AMD-V
- **L1d cache:** 32K
- **L1i cache:** 32K
- **L2 cache:** 512K
- **L3 cache:** 16384K
- **NUMA node0 CPU(s):** 0-7,16-23
- **NUMA node1 CPU(s):** 8-15,24-31
- **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 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 extapic cr8_legacy abm sse4a misalignsse 3dnowprefetch osvw ibs skinit wdt tce topoext perfctr_core perfctr_nb bixext perfctr_llc mwaitx cpb cat_l3 cdp_l3 hw_pstate sme ssbd mba sev ibpb stibp vmmcall fsgsbase bm1 avx2 smep bmi2 cqm rdt_a rdseed adx smap clflushopt clwb sha_ni xsaveopt xsaves cqm_l1c cqm_occup_llc cqm_mmb_total cqm_mmb_local clzero irperf xsaveerptr wbnoinvd arat npt lbrv svm_lock nrip_save tsc_scale vmcb_clean flushbyasid decodeassist 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:** 2 nodes (0-1)
  - node 0 cpus: 0 1 2 3 4 5 6 7 16 17 18 19 20 21 22 23
  - node 0 size: 257888 MB
  - node 0 free: 257151 MB
  - node 1 cpus: 8 9 10 11 12 13 14 15 24 25 26 27 28 29 30 31
  - node 1 size: 258042 MB
  - node 1 free: 257669 MB

From `/proc/meminfo`

- **MemTotal:** 528313024 kB
- **HugePages_Total:** 0
- **Hugepagesize:** 2048 kB

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

- **debian_version:** buster/sid
- **os-release:** NAME="Ubuntu"

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Platform Notes (Continued)

VERSION="19.04 (Disco Dingo)"
ID=ubuntu
ID_LIKE=debian
PRETTY_NAME="Ubuntu 19.04"
VERSION_ID="19.04"
HOME_URL="https://www.ubuntu.com/
SUPPORT_URL="https://help.ubuntu.com/

uname -a:
Linux h12dst-01 5.0.0-25-generic #26-Ubuntu SMP Thu Aug 1 12:04:58 UTC 2019 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: usercopy/swapgs barriers and __user
pointer sanitation
CVE-2017-5715 (Spectre variant 2): Mitigation: Full AMD retpoline, IBBP:
conditional, IBRS_FW, STIBP: conditional, RSB
filling

run-level 3 Feb 21 11:03

SPEC is set to: /home/cpu2017
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda2 ext4 183G 29G 145G 17% /

From /sys/devices/virtual/dmi/id
BIOS: American Megatrends Inc. 1.1 01/10/2020
Vendor: Supermicro
Product: Super Server
Serial: 0123456789

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:
16x SK Hynix HMA84GR7CJR4N-XN 32 kB 2 rank 3200

(End of data from sysinfo program)
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**Compiler Version Notes**

---

```
C       | 600.perlbench_s(base, peak) 602.gcc_s(base, peak) 605.mcf_s(base, peak) 625.x264_s(base, peak) 657.xz_s(base, peak)
```

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++     | 623.xalancbmk_s(peak)
```

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: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin

---

```
C++     | 620.omnetpp_s(base, peak) 623.xalancbmk_s(base) 631.deepsjeng_s(base, peak) 641.leela_s(base, peak)
```

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Fortran | 648.exchange2_s(base, peak)

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

Base Compiler Invocation

C benchmarks:
clang

C++ benchmarks:
clang++

Fortran benchmarks:
flang

Base Portability Flags

600.perlbench_s: -DSPEC_LINUX_X64 -DSPEC_LP64
602.gcc_s: -DSPEC_LP64
605.mcf_s: -DSPEC_LP64
620.omnetpp_s: -DSPEC_LP64
623.xalancbmk_s: -DSPEC_LINUX -DSPEC_LP64
625.x264_s: -DSPEC_LP64
631.deepsjeng_s: -DSPEC_LP64
641.leela_s: -DSPEC_LP64
648.exchange2_s: -DSPEC_LP64
657.xz_s: -DSPEC_LP64
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Base Optimization Flags

C benchmarks:
- -fno-microlib -Wl,-mllvm -Wl,-region-vectorize -Wl,-mllvm -Wl,-vector-library=LIBMVEC
- -Wl,-mllvm -Wl,-reduce-array-computations=3 -O3 -ffast-math
- -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 -z muldefs -DSPEC_OPENMP -fopenmp
- -fopenmp=libomp -lm -lpthread -ldl -lm -lvecl -lpgl
- -lflang

C++ benchmarks:
- -fno-microlib -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
- -mllvm -loop-unswitch-threshold=200000 -mllvm -vector-library=LIBMVEC
- -mllvm -unroll-threshold=100 -flv-function-specialization
- -mllvm -enable-partial-unswitch -z muldefs -DSPEC_OPENMP -fopenmp
- -fopenmp=libomp -lm -lpthread -ldl -lm -lvecl -lpgl
- -lflang

Fortran benchmarks:
- -fno-microlib -Wl,-mllvm -Wl,-region-vectorize -Wl,-mllvm -Wl,-vector-library=LIBMVEC
- -Wl,-mllvm -Wl,-reduce-array-computations=3 -ffast-math
- -Wl,-mllvm -Wl,-inline-recursion=4 -Wl,-isr-in-nested-loop
- -Wl,-mllvm -Wl,-enable-iv-split -O3 -march=znver2 -funroll-loops
- -Mrecursive -mllvm -vector-library=LIBMVEC -z muldefs
- -mllvm -disable-indvar-simplify -mllvm -unroll-aggressive
- -mllvm -unroll-threshold=150 -DSPEC_OPENMP -fopenmp -fopenmp=libomp
- -lomp -lpthread -ldl -lm -lvecl -lpgl
- -lflang

Base Other Flags

C benchmarks:
- -Wunused-return-type -DUSE_OPENMP

C++ benchmarks:
- -Wunused-return-type -DUSE_OPENMP

Fortran benchmarks:
- -DUSE_OPENMP -Wunused-return-type
## SPEC® CPU®2017 Integer Speed Result

### Supermicro

A+ Server 2124BT-HTR  
(H12DST-B , AMD EPYC 7262)

<table>
<thead>
<tr>
<th>SPECspeed®2017_int_base</th>
<th>SPECspeed®2017_int_peak</th>
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<tr>
<td>8.83</td>
<td>9.02</td>
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</table>

### Peak Compiler Invocation

- **C benchmarks:** `clang`
- **C++ benchmarks:** `clang++`
- **Fortran benchmarks:** `flang`

### Peak Portability Flags

- 600.perlbench_s: `-DSPEC_LINUX_X64 -DSPEC_LP64`
- 602.gcc_s: `-DSPEC_LP64`
- 605.mcf_s: `-DSPEC_LP64`
- 620.omnetpp_s: `-DSPEC_LP64`
- 623.xalancbmk_s: `-DSPEC_LINUX -D_FILE_OFFSET_BITS=64`
- 625.x264_s: `-DSPEC_LP64`
- 631.deepsjeng_s: `-DSPEC_LP64`
- 641.leela_s: `-DSPEC_LP64`
- 648.exchange2_s: `-DSPEC_LP64`
- 657.xz_s: `-DSPEC_LP64`

### Peak Optimization Flags

- **C benchmarks:**
  - `-flto -Wl,-mllvm -Wl,-function-specialize`
  - `-Wl,-mllvm -Wl,-region-vectorize`
  - `-Wl,-mllvm -Wl,-vector-library=LIBMVEC`
  - `-Wl,-mllvm -Wl,-reduce-array-computations=3`
  - `-fprofile-instr-generate(pass 1)`
  - `-fprofile-instr-use(pass 2) -Ofast -march=znver2`
  - `-mno-sse4a -fstruct-layout=5`
  - `-mllvm -vectorize-memory-aggressively`
  - `-mllvm -function-specialize -mllvm -enable-gvn-hoist`
  - `-mllvm -unroll-threshold=50 -fremap-arrays`
  - `-mllvm -vector-library=LIBMVEC`
  - `-mllvm -reduce-array-computations=3`
  - `-mllvm -global-vectorize-slp -mllvm -inline-threshold=1000`
  - `-flv-function-specialization -DSPEC_OPENMP -fopenmp`
  - `-lmvec -lamlilibm -fopenmp=libomp -lomp -lpthread -ldl -ljemalloc -lflang`

(Continued on next page)
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SPEC CPU®2017 Integer Speed Result

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SPECspeed®2017_int_base = 8.83
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CPU2017 License: 001176
Test Date: Feb-2020
Test Sponsor: Supermicro
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Tested by: Supermicro
Software Availability: Aug-2019

Peak Optimization Flags (Continued)

602.gcc_s: basepeak = yes

605.mcf_s: -flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-region-vectorize
-Wl,-mllvm -Wl,-vector-library=LIBMVEC
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast
-march=znver2 -mno-sse4a -fstruct-layout=5
-mllvm -vectorize-memory-aggressively
-mllvm -function-specialize -mllvm -enable-gvn-hoist
-mllvm -unroll-threshold=50 -fremap-arrays
-mllvm -vector-library=LIBMVEC
-mllvm -reduce-array-computations=3
-mllvm -global-vectorize-slp -mllvm -inline-threshold=1000
-llvm-function-specialization -DSPEC_OPENMP -fopenmp
-llmvec -landlibm -fopenmp=libomp -lomp -lpthread -ldl
-ljemalloc -lflang

625.x264_s: Same as 600.perlbench_s

657.xz_s: basepeak = yes

C++ benchmarks:

620.omnetpp_s: basepeak = yes

623.xalancbmk_s: -m32 -flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-region-vectorize
-Wl,-mllvm -Wl,-vector-library=LIBMVEC
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast
-march=znver2 -flv-function-specialization
-mllvm -unroll-threshold=100
-mllvm -enable-partial-unswitch
-mllvm -loop-unswitch-threshold=200000
-mllvm -vector-library=LIBMVEC
-mllvm -inline-threshold=1000 -DSPEC_OPENMP -fopenmp
-fopenmp=libomp -lomp -lpthread -ldl -ljemalloc

631.deepsjeng_s: -flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-region-vectorize
-Wl,-mllvm -Wl,-vector-library=LIBMVEC
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast
-march=znver2 -flv-function-specialization
-mllvm -unroll-threshold=100
-mllvm -enable-partial-unswitch

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CPU2017 License: 001176
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Peak Optimization Flags (Continued)

631.deepsjeng_s (continued):
-mllvm -loop-unswitch-threshold=200000
-mllvm -vector-library=LIBMVEC
-mllvm -inline-threshold=10000000 -DSPEC_OPENMP -fopenmp
-fopenmp=libomp -lomp -lpthread -ldl -lmvec -lamdlibm
-ljemalloc -lflang

641.leela_s: basepeak = yes

Fortran benchmarks:
648.exchange2_s: basepeak = yes

Peak Other Flags

C benchmarks:
-Wno-return-type -DUSE_OPENMP

C++ benchmarks (except as noted below):
-Wno-return-type -DUSE_OPENMP

623.xalancbmk_s: -Wno-return-type -DUSE_OPENMP
-L/sppo/dev/cpu2017/v110/amd_speed_aocc200_rome_C_lib/32

Fortran benchmarks:
-DUSE_OPENMP -Wno-return-type

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:
http://www.spec.org/cpu2017/flags/Supermicro-Platform-Settings-V1.2-Rome-revB.xml

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