ASUSTeK Computer Inc.

ASUS RS520A-E11(KMPA-U16) Server System
2.30 GHz, AMD EPYC 7643

SPECspeed®2017_fp_base = 158
SPECspeed®2017_fp_peak = 162

CPU2017 License: 9016
Test Sponsor: ASUSTeK Computer Inc.
Tested by: ASUSTeK Computer Inc.

Threads

<table>
<thead>
<tr>
<th>SPECspeed®2017_fp_base (158)</th>
<th>SPECspeed®2017_fp_peak (162)</th>
</tr>
</thead>
</table>
| Threads
| 603.bwaves_s 48
| 607.cactuBSSN_s 48
| 619.lbm_s 96
| 621.wrf_s 48
| 627.cam4_s 48
| 628.pop2_s 48
| 638.imagick_s 48
| 644.nab_s 96
| 649.fotonik3d_s 48
| 654.roms_s 48 |

Hardware

CPU Name: AMD EPYC 7643
Max MHz: 3600
Nominal: 2300
Enabled: 48 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: 256 MB I+D on chip per chip, 32 MB shared / 6 cores
Other: None
Memory: 512 GB (8 x 64 GB 4Rx4 PC4-3200AA-L)
Storage: 1 x 240 GB SATA SSD
Other: None

Software

OS: SUSE Linux Enterprise Server 15 SP2 (x86_64)
Kernel 5.3.18-22-default
Compiler: C/C++/Fortran: Version 3.0.0 of AOCC
Parallel: Yes
Firmware: Version 0401 released Apr-2021
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 64-bit
Other: jemalloc: jemalloc memory allocator library v5.1.0
Power Management: BIOS and OS set to prefer performance at the cost of additional power usage.
ASUSTeK Computer Inc.  
ASUS RS520A-E11(KMPA-U16) Server System  
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SPECspeed®2017_fp_base = 158  
SPECspeed®2017_fp_peak = 162

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>
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<tr>
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<td>48</td>
<td>156</td>
<td>379</td>
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<td>607.cactuBSSN_s</td>
<td>48</td>
<td>67.4</td>
<td>247</td>
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<td>67.2</td>
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<tr>
<td>619.lbm_s</td>
<td>48</td>
<td>78.5</td>
<td>66.7</td>
<td>77.3</td>
<td>67.8</td>
<td>77.1</td>
<td>67.9</td>
<td>96</td>
<td>69.4</td>
<td>75.4</td>
<td>72.8</td>
<td>72.0</td>
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<tr>
<td>621.wrf_s</td>
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<td>164</td>
<td>81.1</td>
<td>163</td>
<td>81.0</td>
<td>163</td>
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<td>81.5</td>
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<td>80.8</td>
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<td>80.2</td>
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<td>627.cam4_s</td>
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<td>75.9</td>
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<tr>
<td>638.imagick_s</td>
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<tr>
<td>644.nab_s</td>
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<td>649.fotonik3d_s</td>
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<td>77.1</td>
<td>127</td>
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<td>117</td>
<td>77.6</td>
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<td>654.roms_s</td>
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<td>80.6</td>
<td>195</td>
<td>80.2</td>
<td>196</td>
<td>80.2</td>
</tr>
</tbody>
</table>

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 limit  
'ulimit -l 2097152' was used to set environment locked pages in memory limit  
OS set to performance mode via cpupower frequency-set -g performance  
runcpu command invoked through numactl i.e.:  
numactl --interleave=all runcpu <etc>  
'echo 8 > /proc/sys/vm/dirty_ratio' run as root to limit dirty cache to 8% of memory.  
'echo 1 > /proc/sys/vm/swappiness' run as root to limit swap usage to minimum necessary.  
'echo 1 > /proc/sys/vm/zone_reclaim_mode' run as root to free node-local memory and avoid remote memory usage.  
'sync; echo 3 > /proc/sys/vm/drop_caches' run as root to reset filesystem caches.  
'sysctl -w kernel.randomize_va_space=0' run as root to disable address space layout randomization (ASLR) to reduce run-to-run variability.  
To enable Transparent Hugepages (THP) for all allocations,  

(Continued on next page)
### Operating System Notes (Continued)

- "echo always > /sys/kernel/mm/transparent_hugepage/enabled" and
- "echo always > /sys/kernel/mm/transparent_hugepage/defrag" run as root.
To enable THP only on request for peak runs of 628.pop2_s, and 638.imagick_s,
- "echo madvise > /sys/kernel/mm/transparent_hugepage/enabled" run as root.
To disable THP for peak runs of 627.cam4_s, 644.nab_s, 649.fotonik3d_s, and 654.roms_s,
- "echo never > /sys/kernel/mm/transparent_hugepage/enabled" run as root.

### Environment Variables Notes

Environment variables set by runcpu before the start of the run:
- GOMP_CPU_AFFINITY = "0-95"
- LD_LIBRARY_PATH = 
  
  "/cpu118/amd_speed_aocc300_milan_B_lib/64;/cpu118/amd_speed_aocc300_milan_B_lib/32:"  
- MALLOC_CONF = "retain:true"
- OMP_DYNAMIC = "false"
- OMP_SCHEDULE = "static"
- OMP_STACKSIZE = "128M"
- OMP_THREAD_LIMIT = "96"

Environment variables set by runcpu during the 619.lbm_s peak run:
- GOMP_CPU_AFFINITY = "0 48 1 49 2 50 3 51 4 52 5 53 6 54 7 55 8 56 9 57 10 58 11 59 12 60 13 61 14 62 15 63 16 64 17 65 18 66 19 67 20 68 21 69 22 70 23 71 24 72 25 73 26 74 27 75 28 76 29 77 30 78 31 79 32 80 33 81 34 82 35 83 36 84 37 85 38 86 39 87 40 88 41 89 42 90 43 91 44 92 45 93 46 94 47 95"

Environment variables set by runcpu during the 621.wrf_s peak run:
- GOMP_CPU_AFFINITY = "0-47"

Environment variables set by runcpu during the 644.nab_s peak run:
- GOMP_CPU_AFFINITY = "0 48 1 49 2 50 3 51 4 52 5 53 6 54 7 55 8 56 9 57 10 58 11 59 12 60 13 61 14 62 15 63 16 64 17 65 18 66 19 67 20 68 21 69 22 70 23 71 24 72 25 73 26 74 27 75 28 76 29 77 30 78 31 79 32 80 33 81 34 82 35 83 36 84 37 85 38 86 39 87 40 88 41 89 42 90 43 91 44 92 45 93 46 94 47 95"

Environment variables set by runcpu during the 654.roms_s peak run:
- GOMP_CPU_AFFINITY = "0-47"

### General Notes

Binaries were compiled on a system with 2x AMD EPYC 7742 CPU + 1TiB Memory using OpenSUSE 15.2

NA: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown)
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- **Test Sponsor:** ASUSTeK Computer Inc.
- **Tested by:** ASUSTeK Computer Inc.
- **Test Date:** Jul-2021
- **Hardware Availability:** May-2021
- **Software Availability:** Mar-2021

**General Notes (Continued)**

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 v4.8.2 in RHEL 7.4 (No options specified)
jemalloc 5.1.0 is available here:
https://github.com/jemalloc/jemalloc/releases/download/5.1.0/jemalloc-5.1.0.tar.bz2

**Platform Notes**

- **BIOS Configuration:**
  - DLWM Support = Disabled
  - SVM Mode = Disabled
  - NUMA nodes per socket = NPS2
  - APBDIS = 1
  - Fix SOC P-state = P0
  - Engine Boost = Enabled
  - IOMMU = Disabled

Sysinfo program /cpu18/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acacf64d
running on localhost Wed Jul 7 11:05:55 2021

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 7643 48-Core Processor
  - 1 "physical id"s (chips)
  - 96 "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 : 48
  - siblings : 96
  - physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29 32 33 34 35 36 37 40 41 42 43 44 45 48 49 50 51 52 53 56 57 58 59 60 61

From lscpu from util-linux 2.33.1:
  - Architecture: x86_64
  - CPU op-mode(s): 32-bit, 64-bit
  - Byte Order: Little Endian
  - Address sizes: 48 bits physical, 48 bits virtual

(Continued on next page)
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 Platform Notes (Continued)

CPU(s): 96  
On-line CPU(s) list: 0-95  
Thread(s) per core: 2  
Core(s) per socket: 48  
Socket(s): 1  
NUMA node(s): 2  
Vendor ID: AuthenticAMD  
CPU family: 25  
Model: 1  
Model name: AMD EPYC 7643 48-Core Processor  
Stepping: 1  
CPU MHz: 1789.993  
CPU max MHz: 2300.0000  
CPU min MHz: 1500.0000  
BogoMIPS: 4591.14  
Virtualization: AMD-V  
L1d cache: 32K  
L1i cache: 32K  
L2 cache: 512K  
L3 cache: 32768K  
NUMA node0 CPU(s): 0-23,48-71  
NUMA node1 CPU(s): 24-47,72-95  
Flags: fpu vme de pse tsc msr pae mce cmov pat pse36 clf flush mmx fxsr sse sse2 ht syscall nx mmxext fxsr_opt pdpe1gb rdtsscp lm constant_tsc rep_good nopl nonstop_tsc cpuid extd_apicid aperfmperf pni pclmulqdq monitor ssse3 fma cx16 pcid 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 bptext perfctr_l1c mwaitx cbp cat_l3 cdpl_l3 invpcid_single hw_pstate ssbd mba ibrs ibpb stibp vmmcall fsgsbase bmi1 avx2 smep bmi2 erms invpcid cmq rdt_a rdseed adx smap clfshopt clwb sha_ni xsaveopt xsavec xgetbv1 xsaves cmq_llc cmq_occup_llc cmq_mbm_total cmq_mbm_local clzero irperf xsaverptr wbinvd arat npt lbrv svm_lock nrip_save tsc_scale vmcb_clean flushbyasid decodeassists pausefilter pthreshold v_vmsave_vmload vgif umip pkt ospke vaes vpclmulqdq rdpid overflow_recov succor smca

From /proc/cpuinfo

cache size: 512 KB

WARNING: a numacl '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 16 17 18 19 20 21 22 23 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71  
node 0 size: 257847 MB  
node 0 free: 257268 MB  
node 1 cpus: 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95

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Software Availability: Mar-2021

Platform Notes (Continued)

node 1 size: 257987 MB
node 1 free: 257252 MB
node distances:
node 0 1
  0: 10 12
  1: 12 10

From /proc/meminfo
MemTotal: 528214964 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-SP2"
VERSION_ID="15.2"
PRETTY_NAME="SUSE Linux Enterprise Server 15 SP2"
ID="sles"
ID_LIKE="suse"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:15:sp2"

uname -a:
Linux localhost 5.3.18-22-default #1 SMP Wed Jun 3 12:16:43 UTC 2020 (720aeba) 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:
CVE-2017-5754 (Meltdown): Not affected
CVE-2017-5754 (Meltdown): Mitigation: Speculative Store Bypass disabled via prctl and seccomp
CVE-2018-3639 (Speculative Store Bypass):
CVE-2017-5753 (Spectre variant 1): Mitigation: usercopy/swapgs barriers and __user pointer sanitation
CVE-2017-5715 (Spectre variant 2):
CVE-2020-0543 (Special Register Buffer Data Sampling):
CVE-2019-11135 (TSX Asynchronous Abort):
(Continued on next page)
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Platform Notes (Continued)

run-level 3 Jul 7 09:24

SPEC is set to: /cpu118
Filesystem     Type  Size  Used Avail Use% Mounted on
/dev/sda4      xfs   199G   26G  174G  13% /

From /sys/devices/virtual/dmi/id
Vendor:         ASUSTeK COMPUTER INC.
Product:        RS520A-E11-RS24U
Product Family: Server
Serial:         333366669999

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:
  8x Samsung M386A8K40DM2-CWE 64 GB 4 rank 3200
  8x Unknown Unknown

BIOS:
  BIOS Vendor: American Megatrends Inc.
  BIOS Version: 0401
  BIOS Date: 04/14/2021
  BIOS Revision: 4.1

(End of data from sysinfo program)

Compiler Version Notes

==================================
C               | 619.lbm_s(base, peak) 638.imagick_s(base, peak)
| 644.nab_s(base, peak)
==================================
AMD clang version 12.0.0 (CLANG: AOCC_3.0.0-Build#78 2020_12_10) (based on LLVM Mirror.Version.12.0.0)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin

==================================
C++, C, Fortran | 607.cactusBSSN_s(base, peak)
==================================
AMD clang version 12.0.0 (CLANG: AOCC_3.0.0-Build#78 2020_12_10) (based on...
Compiler Version Notes (Continued)

LLVM Mirror.Version.12.0.0
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin
AMD clang version 12.0.0 (CLANG: AOCC_3.0.0-Build#78 2020_12_10) (based on LLVM Mirror.Version.12.0.0)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin
AMD clang version 12.0.0 (CLANG: AOCC_3.0.0-Build#78 2020_12_10) (based on LLVM Mirror.Version.12.0.0)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin

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

AMD clang version 12.0.0 (CLANG: AOCC_3.0.0-Build#78 2020_12_10) (based on LLVM Mirror.Version.12.0.0)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin

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

AMD clang version 12.0.0 (CLANG: AOCC_3.0.0-Build#78 2020_12_10) (based on LLVM Mirror.Version.12.0.0)
Target: x86_64-unknown-linux-gnu
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InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin
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<td>Mar-2021</td>
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</table>

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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

---

**Base Portability Flags**

603.bwaves_s: -DSPEC_LP64  
607.cactuBSSN_s: -DSPEC_LP64  
619.lbm_s: -DSPEC_LP64  
621.wrf_s: -DSPEC_CASE_FLAG -Mbyteswapio -DSPEC_LP64  
627.cam4_s: -DSPEC_CASE_FLAG -DSPEC_LP64  
628.pop2_s: -DSPEC_CASE_FLAG -Mbyteswapio -DSPEC_LP64  
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 -mno-adx -mno-sse4a -Wl,-mllvm -Wl,-region-vectorize  
- -Wl,-mllvm -Wl,-function-specialize  
- -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6  
- -Wl,-mllvm -Wl,-reduce-array-computations=3 -O3 -march=znver3  
- -fveclib=AMDLIBM -ffast-math -flto -fstruct-layout=5  
- -mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000  
- -fremap-arrays -mllvm -function-specialize -flv-function-specialization  
- -mllvm -enable-gvn-hoist -mllvm -global-vectorize-slp=true  
- -mllvm -enable-lcm-vrp -mllvm -reduce-array-computations=3 -z muldefs  
- -DSPEC_OPENMP -fopenmp -fopenmp=libomp -lomp -lamdlibm -ljemalloc  
- -lflang -lflangrti

Fortran benchmarks:
- -m64 -mno-adx -mno-sse4a -Wl,-mllvm -Wl,-enable-X86-prefetching

(Continued on next page)
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SPECspeed®2017_fp_peak = 162

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Test Sponsor: ASUSTeK Computer Inc.
Test Date: Jul-2021
Tested by: ASUSTeK Computer Inc.
Hardware Availability: May-2021
Software Availability: Mar-2021

Base Optimization Flags (Continued)

Fortran benchmarks (continued):
-Wl,-mllvm -Wl,enable-licm-vrp -Wl,-mllvm -Wl,region-vectorize
-Wl,-mllvm -Wl,--function-specialize
-Wl,-mllvm -Wl,--align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,--reduce-array-computations=3 -Hz,1,0xl -03
-march=znver3 -fveclib=AMDLIBM -ffast-math -Mrecursive
-mllvm --fuse-tile-inner-loop -funroll-loops
-mllvm --extra-vectorizer-passes -mllvm -lsr-in-nested-loop
-mllvm --enable-licm-vrp -mllvm --reduce-array-computations=3
-mllvm --global-vectorize-slp=true -z muldefs -DSPEC_OPENMP -fopenmp
-fopenmp=libomp -lomp -lamdlibm -ljemalloc -lflang -lflangrti

Benchmarks using both Fortran and C:
-m64 -mno-adx -mno-sse4a -Wl,-mllvm -Wl,--enable-X86-prefetching
-Wl,-mllvm -Wl,--enable-licm-vrp -Wl,-mllvm -Wl,--region-vectorize
-Wl,-mllvm -Wl,--function-specialize
-Wl,-mllvm -Wl,--align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,--reduce-array-computations=3 -03 -march=znver3
-fveclib=AMDLIBM -ffast-math -flto -fstruct-layout=5
-mllvm --unroll-threshold=50 -mllvm --inline-threshold=1000
-fremap-arrays -mllvm --function-specialize -flv-function-specialization
-mllvm --enable-gvn-hoist -mllvm --global-vectorize-slp=true
-mllvm --enable-licm-vrp -mllvm --reduce-array-computations=3 -Hz,1,0xl
-Mrecursive -mllvm --fuse-tile-inner-loop -funroll-loops
-mllvm --extra-vectorizer-passes -mllvm -lsr-in-nested-loop -z muldefs
-DSPEC_OPENMP -fopenmp -fopenmp=libomp -lomp -lamdlibm -ljemalloc
-lflang -lflangrti

Benchmarks using Fortran, C, and C++:
-m64 -mno-adx -mno-sse4a -std=c++98
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false
-Wl,-mllvm -Wl,-region-vectorize -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -03 -march=znver3
-fveclib=AMDLIBM -ffast-math -flto -fstruct-layout=5
-mllvm --unroll-threshold=50 -mllvm --inline-threshold=1000
-fremap-arrays -mllvm --function-specialize -flv-function-specialization
-mllvm --enable-gvn-hoist -mllvm --global-vectorize-slp=true
-mllvm --enable-licm-vrp -mllvm --reduce-array-computations=3
-mllvm --enable-partial-unswitch -mllvm --unroll-threshold=100
-finline-aggressive -mllvm --loop-unswitch-threshold=200000
-mllvm --reroll-loops -mllvm --aggressive-loop-unswitch
-mllvm --extra-vectorizer-passes -mllvm --convert-pow-exp-to-int=false
-Hz,1,0xl -Mrecursive -mllvm --fuse-tile-inner-loop -funroll-loops
-mllvm -lsr-in-nested-loop -z muldefs -DSPEC_OPENMP -fopenmp
-fopenmp=libomp -lomp -lamdlibm -ljemalloc -lflang -lflangrti
SPEC CPU®2017 Floating Point Speed Result
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ASUSTeK Computer Inc.
ASUS RS520A-E11(KMPA-U16) Server System
2.30 GHz, AMD EPYC 7643

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Base Other Flags

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

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

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

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

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

Peak Optimization Flags

C benchmarks:
619.lbm_s:  -m64  -mno-adx  -mno-sse4a
-Wl,-mllvm  -Wl,-function-specialize
-Wl,-mllvm  -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm  -Wl,-reduce-array-computations=3  -Ofast
-march=znver3  -fveclib=AMDLIBM  -ffast-math  -flto
-fstruct-layout=5  -mllvm  -unroll-threshold=50

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Peak Optimization Flags (Continued)

619.lbm_s (continued):
-fremap-arrays -flv-function-specialization
-mllvm -inline-threshold=1000 -mllvm -enable-gvn-hoist
-mllvm -global-vectorize-slp=true
-mllvm -function-specialize -mllvm -enable-licm-vrp
-mllvm -reduce-array-computations=3 -DSPEC_OPENMP -fopenmp
-fopenmp=libomp -lomp -lamdlibm -ljemalloc -lflang

638.imagick_s: basepeak = yes

644.nab_s: -m64 -mno-adx -mno-sse4a -Wl,-mllvm -Wl,-region-vectorize
-Wl,-mllvm -Wl,-function-specialize -Ofast -march=znver3
-fveclib=AMDLIBM -ffast-math -flto -fstruct-layout=5
-mllvm -unroll-threshold=50 -fremap-arrays
-flv-function-specialization -mllvm -inline-threshold=1000
-mllvm -enable-gvn-hoist -mllvm -global-vectorize-slp=true
-mllvm -function-specialize -mllvm -enable-licm-vrp
-mllvm -reduce-array-computations=3 -DSPEC_OPENMP -fopenmp
-fopenmp=libomp -lomp -lamdlibm -ljemalloc -lflang

Fortran benchmarks:

603.bwaves_s: basepeak = yes

649.fotonik3d_s: basepeak = yes

654.roms_s: -m64 -mno-adx -mno-sse4a
-Wl,-mllvm -Wl,-enable-X86-prefetching
-Wl,-mllvm -Wl,-enable-licm-vrp
-Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast
-march=znver3 -fveclib=AMDLIBM -ffast-math -Mrecursive
-mllvm -reduce-array-computations=3
-mllvm -global-vectorize-slp=true -mllvm -enable-licm-vrp
-DSPEC_OPENMP -fopenmp -fopenmp=libomp -lomp -lamdlibm
-ljemalloc -lflang

Benchmarks using both Fortran and C:

621.wrf_s: -m64 -mno-adx -mno-sse4a
-Wl,-mllvm -Wl,-enable-X86-prefetching
-Wl,-mllvm -Wl,-enable-licm-vrp
-Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast

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SPEC speed

SPEC 2017 Floating Point Speed Result

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Peak Optimization Flags (Continued)

621.wrf_s (continued):
-march=znver3 -fveclib=AMDLIBM -ffast-math -flto
-fstruct-layout=5 -mliruv -unroll-threshold=50
-fremap-arrays -f1v-function-specialization
-mliruv -inline-threshold=1000 -mliruv -enable-gvn-hoist
-mliruv -global-vectorize-slp=true
-mliruv -function-specialize -mliruv -enable-lcvm-vrp
-mliruv -reduce-array-computations=3 -Hz,1,0x1 -03
-Mrecursive -mliruv -fuse-tile-inner-loop -funroll-loops
-mliruv -extra-vectorizer-passes -mliruv -lsr-in-nested-loop
-DSPEC_OPENMP -fopenmp -fopenmp=libomp -lomp -lamdlibm
-ljemalloc -lflang

627.cam4_s: basepeak = yes
628.pop2_s: basepeak = yes

Benchmarks using Fortran, C, and C++:
607.cactuBSSN_s: basepeak = yes

Peak Other Flags

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

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

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

Benchmarks using Fortran, C, and C++:
-Wno-unused-command-line-argument -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/ASUSTekPlatform-Settings-AMD-Milan-V1.3.2021-07-06.xml
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