SPEC CPU®2017 Floating Point Rate Result

Copyright 2017-2021 Standard Performance Evaluation Corporation

ASUSTeK Computer Inc.

ASUS RS720A-E11(KMPP-D32) Server System
2.45 GHz, AMD EPYC 7763

$SPECrate®2017\_fp\_base = 663$

$SPECrate®2017\_fp\_peak = 710$

Benchmark	Copies	base	peak
503.bwaves_r	128	798	
507.cactuBSSN_r	128	770	774
508.namd_r	128 / 256	617	730
510.parest_r	128	757	
511.povray_r	128 / 256	875	978
519.lbm_r	128	193	
521.wrf_r	128	526	
526.blender_r	128 / 256	883	1010
527.cam4_r	128 / 256	801	811
538.imagick_r	128 / 256	3060	3410
544.nab_r	128 / 256	1150	1500
549.fotonik3d_r	128 / 64	266	267
554.roms_r	128 / 64	282	310

SPECrate®2017_fp_base (663)   SPECrate®2017_fp_peak (710)

Hardware

CPU Name: AMD EPYC 7763
 Max MHz: 3500
 Nominal: 2450
Enabled: 128 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: 256 MB I+D on chip per chip, 32 MB shared / 8 cores
 Other: None
Memory: 1 TB (16 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: No
Firmware: Version 0701 released Aug-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.

SPEC CPU®2017 Floating Point Rate Result
Copyright 2017-2021 Standard Performance Evaluation Corporation

ASUSTeK Computer Inc.

ASUS RS720A-E11(KMPP-D32) Server System
2.45 GHz, AMD EPYC 7763

SPECrate®2017_fp_base = 663

SPECrate®2017_fp_peak = 710
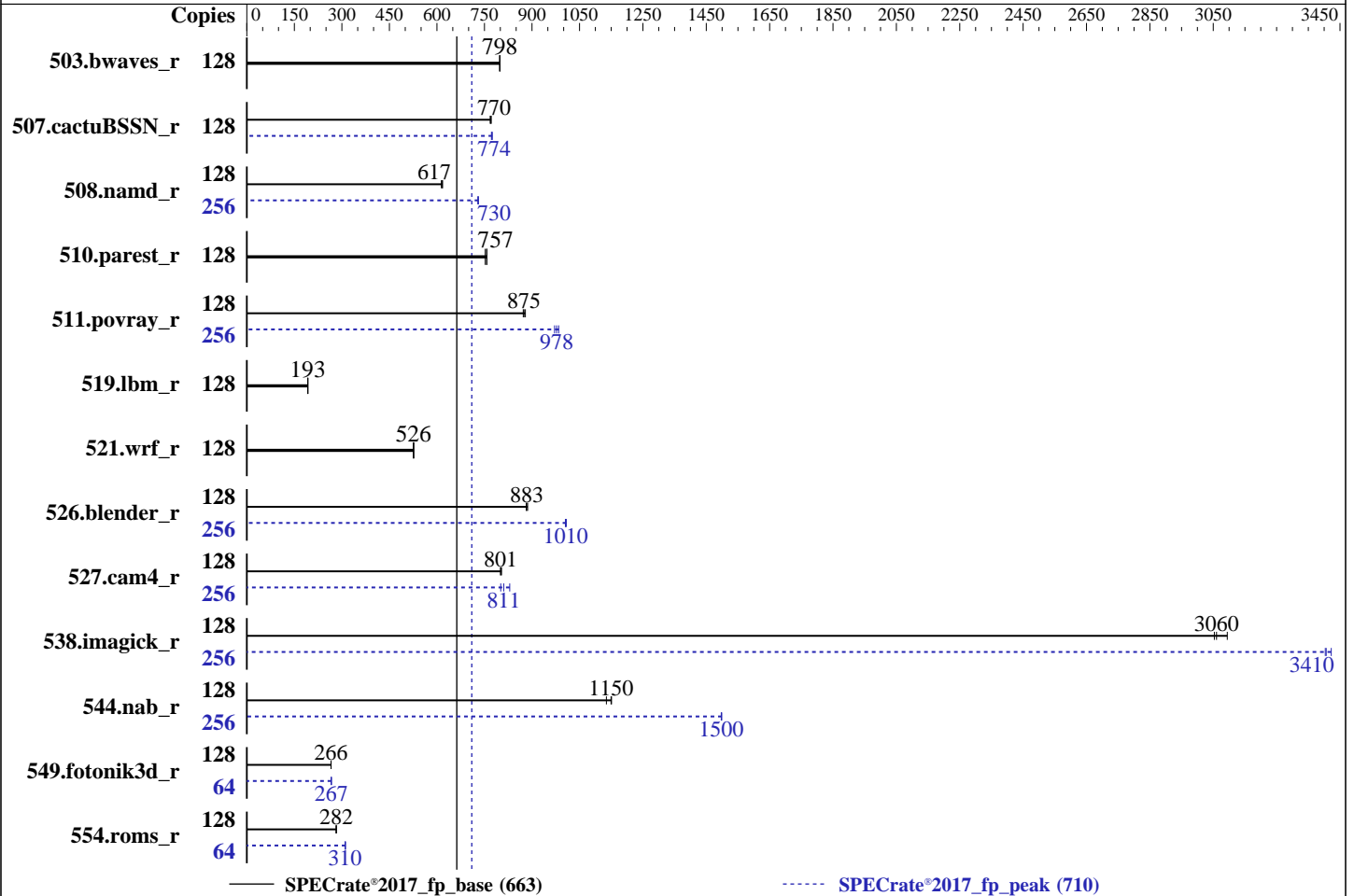
CPU2017 License: 9016							**Test Date:** Nov-2021				
Test Sponsor: ASUSTeK Computer Inc.							**Hardware Availability:** Aug-2021				
Tested by: ASUSTeK Computer Inc.							**Software Availability:** Mar-2021				

Results Table

| Benchmark | Base | | | | | | | Peak | | | | | | |
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
503.bwaves_r	128	**1608**	**798**	1608	798	1608	798	128	**1608**	**798**	1608	798	1608	798
507.cactuBSSN_r	128	210	771	**210**	**770**	211	768	128	**209**	**774**	210	772	209	774
508.namd_r	128	197	618	198	614	**197**	**617**	256	333	731	333	730	**333**	**730**
510.parest_r	128	442	757	**442**	**757**	445	752	128	442	757	**442**	**757**	445	752
511.povray_r	128	340	879	343	872	**342**	**875**	256	607	984	**611**	**978**	615	971
519.lbm_r	128	701	193	**701**	**193**	701	192	128	701	193	**701**	**193**	701	192
521.wrf_r	128	545	526	544	527	**545**	**526**	128	545	526	544	527	**545**	**526**
526.blender_r	128	220	886	**221**	**883**	221	882	256	**387**	**1010**	387	1010	388	1010
527.cam4_r	128	**279**	**801**	278	804	280	801	256	540	830	**552**	**811**	559	801
538.imagick_r	128	**104**	**3060**	103	3090	104	3050	256	**187**	**3410**	186	3420	187	3400
544.nab_r	128	187	1150	190	1130	**187**	**1150**	256	**288**	**1500**	288	1500	287	1500
549.fotonik3d_r	128	1875	266	**1877**	**266**	1877	266	64	936	266	935	267	**936**	**267**
554.roms_r	128	720	282	721	282	**721**	**282**	64	328	310	326	312	**328**	**310**

SPECrate®2017_fp_base =	663
SPECrate®2017_fp_peak =	710

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
```

(Continued on next page)

ASUSTeK Computer Inc.

ASUS RS720A-E11(KMPP-D32) Server System
2.45 GHz, AMD EPYC 7763

$SPECrate^{®}2017\_fp\_base = 663$

$SPECrate^{®}2017\_fp\_peak = 710$

CPU2017 License:	9016	**Test Date:**	Nov-2021
Test Sponsor:	ASUSTeK Computer Inc.	**Hardware Availability:**	Aug-2021
Tested by:	ASUSTeK Computer Inc.	**Software Availability:**	Mar-2021

Operating System Notes (Continued)

```
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.
'echo always > /sys/kernel/mm/transparent_hugepage/enabled' and
'echo always > /sys/kernel/mm/transparent_hugepage/defrag' run as root for peak
integer runs and all FP runs to enable Transparent Hugepages (THP).
'echo madvise > /sys/kernel/mm/transparent_hugepage/enabled' run as root for base
integer runs to enable THP only on request.
```

Environment Variables Notes

```
Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH =
      "/cpu118/amd_rate_aocc300_milan_B_lib/lib;/cpu118/amd_rate_aocc300_milan
      _B_lib/lib32:"
MALLOC_CONF = "retain:true"
```

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)
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 = NPS4
APBDIS = 1
Fix SOC P-state = P0
Engine Boost = Enabled
ACPI SRAT L3 Cache as NUMA Domain = Enabled
```

(Continued on next page)

SPEC CPU®2017 Floating Point Rate Result

Copyright 2017-2021 Standard Performance Evaluation Corporation

ASUSTeK Computer Inc.

ASUS RS720A-E11(KMPP-D32) Server System
2.45 GHz, AMD EPYC 7763

SPECrate®2017_fp_base = 663

SPECrate®2017_fp_peak = 710

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

Test Date: Nov-2021
Hardware Availability: Aug-2021
Software Availability: Mar-2021

Platform Notes (Continued)

```
Memory Interleaving = Disabled

 Sysinfo program /cpu118/bin/sysinfo
 Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acafc64d
 running on localhost Tue Nov  2 21:28:38 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 7763 64-Core Processor
       2  "physical id"s (chips)
       256 "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 : 64
       siblings  : 128
       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 60 61 62 63
       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 60 61 62 63

 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
       CPU(s):             256
       On-line CPU(s) list: 0-255
       Thread(s) per core: 2
       Core(s) per socket: 64
       Socket(s):          2
       NUMA node(s):       16
       Vendor ID:          AuthenticAMD
       CPU family:         25
       Model:              1
       Model name:         AMD EPYC 7763 64-Core Processor
       Stepping:           1
       CPU MHz:            1620.082
       CPU max MHz:        2450.0000
       CPU min MHz:        1500.0000
       BogoMIPS:           4890.71
       Virtualization:     AMD-V
       L1d cache:          32K
```

(Continued on next page)

ASUSTeK Computer Inc.

ASUS RS720A-E11(KMPP-D32) Server System
2.45 GHz, AMD EPYC 7763

SPECrate®2017_fp_base = 663

SPECrate®2017_fp_peak = 710

CPU2017 License:	9016	**Test Date:**	Nov-2021
Test Sponsor:	ASUSTeK Computer Inc.	**Hardware Availability:**	Aug-2021
Tested by:	ASUSTeK Computer Inc.	**Software Availability:**	Mar-2021

Platform Notes (Continued)

```
       L1i cache:            32K
       L2 cache:             512K
       L3 cache:             32768K
       NUMA node0 CPU(s):    0-7,128-135
       NUMA node1 CPU(s):    8-15,136-143
       NUMA node2 CPU(s):    16-23,144-151
       NUMA node3 CPU(s):    24-31,152-159
       NUMA node4 CPU(s):    32-39,160-167
       NUMA node5 CPU(s):    40-47,168-175
       NUMA node6 CPU(s):    48-55,176-183
       NUMA node7 CPU(s):    56-63,184-191
       NUMA node8 CPU(s):    64-71,192-199
       NUMA node9 CPU(s):    72-79,200-207
       NUMA node10 CPU(s):   80-87,208-215
       NUMA node11 CPU(s):   88-95,216-223
       NUMA node12 CPU(s):   96-103,224-231
       NUMA node13 CPU(s):   104-111,232-239
       NUMA node14 CPU(s):   112-119,240-247
       NUMA node15 CPU(s):   120-127,248-255
       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 aperfmperf 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 ibs skinit wdt tce topoext perfctr_core perfctr_nb bpext perfctr_llc mwaitx cpb
    cat_l3 cdp_l3 invpcid_single hw_pstate ssbd mba ibrs ibpb stibp vmmcall fsgsbase
    bmi1 avx2 smep bmi2 invpcid cqm rdt_a rdseed adx smap clflushopt clwb sha_ni
    xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local
    clzero irperf xsaveerptr wbnoinvd arat npt lbrv svm_lock nrip_save tsc_scale
    vmcb_clean flushbyasid decodeassists pausefilter pfthreshold v_vmsave_vmload vgif
    umip pku ospke vaes vpclmulqdq 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: 16 nodes (0-15)
   node 0 cpus: 0 1 2 3 4 5 6 7 128 129 130 131 132 133 134 135
   node 0 size: 64310 MB
   node 0 free: 63709 MB
   node 1 cpus: 8 9 10 11 12 13 14 15 136 137 138 139 140 141 142 143
   node 1 size: 64506 MB
   node 1 free: 64004 MB
   node 2 cpus: 16 17 18 19 20 21 22 23 144 145 146 147 148 149 150 151
   node 2 size: 64508 MB
   node 2 free: 64009 MB
```

(Continued on next page)

ASUSTeK Computer Inc.

ASUS RS720A-E11(KMPP-D32) Server System
2.45 GHz, AMD EPYC 7763

SPECrate®2017_fp_base = 663

SPECrate®2017_fp_peak = 710

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

Test Date: Nov-2021
Hardware Availability: Aug-2021
Software Availability: Mar-2021

Platform Notes (Continued)

```
     node 3 cpus: 24 25 26 27 28 29 30 31 152 153 154 155 156 157 158 159
     node 3 size: 64506 MB
     node 3 free: 64019 MB
     node 4 cpus: 32 33 34 35 36 37 38 39 160 161 162 163 164 165 166 167
     node 4 size: 64474 MB
     node 4 free: 63983 MB
     node 5 cpus: 40 41 42 43 44 45 46 47 168 169 170 171 172 173 174 175
     node 5 size: 64506 MB
     node 5 free: 64020 MB
     node 6 cpus: 48 49 50 51 52 53 54 55 176 177 178 179 180 181 182 183
     node 6 size: 64508 MB
     node 6 free: 64014 MB
     node 7 cpus: 56 57 58 59 60 61 62 63 184 185 186 187 188 189 190 191
     node 7 size: 64494 MB
     node 7 free: 64008 MB
     node 8 cpus: 64 65 66 67 68 69 70 71 192 193 194 195 196 197 198 199
     node 8 size: 64508 MB
     node 8 free: 64014 MB
     node 9 cpus: 72 73 74 75 76 77 78 79 200 201 202 203 204 205 206 207
     node 9 size: 64506 MB
     node 9 free: 64017 MB
     node 10 cpus: 80 81 82 83 84 85 86 87 208 209 210 211 212 213 214 215
     node 10 size: 64508 MB
     node 10 free: 63970 MB
     node 11 cpus: 88 89 90 91 92 93 94 95 216 217 218 219 220 221 222 223
     node 11 size: 64506 MB
     node 11 free: 63971 MB
     node 12 cpus: 96 97 98 99 100 101 102 103 224 225 226 227 228 229 230 231
     node 12 size: 64508 MB
     node 12 free: 64009 MB
     node 13 cpus: 104 105 106 107 108 109 110 111 232 233 234 235 236 237 238 239
     node 13 size: 64506 MB
     node 13 free: 64006 MB
     node 14 cpus: 112 113 114 115 116 117 118 119 240 241 242 243 244 245 246 247
     node 14 size: 64508 MB
     node 14 free: 64016 MB
     node 15 cpus: 120 121 122 123 124 125 126 127 248 249 250 251 252 253 254 255
     node 15 size: 64504 MB
     node 15 free: 64012 MB
     node distances:
     node   0   1   2   3   4   5   6   7   8   9  10  11  12  13  14  15
       0:  10  11  12  12  12  12  12  12  32  32  32  32  32  32  32  32
       1:  11  10  12  12  12  12  12  12  32  32  32  32  32  32  32  32
       2:  12  12  10  11  12  12  12  12  32  32  32  32  32  32  32  32
       3:  12  12  11  10  12  12  12  12  32  32  32  32  32  32  32  32
       4:  12  12  12  12  10  11  12  12  32  32  32  32  32  32  32  32
       5:  12  12  12  12  11  10  12  12  32  32  32  32  32  32  32  32
```

(Continued on next page)

ASUSTeK Computer Inc.

ASUS RS720A-E11(KMPP-D32) Server System
2.45 GHz, AMD EPYC 7763

SPECrate®2017_fp_base = 663

SPECrate®2017_fp_peak = 710

CPU2017 License: 9016

Test Sponsor: ASUSTeK Computer Inc.

Tested by: ASUSTeK Computer Inc.

Test Date: Nov-2021

Hardware Availability: Aug-2021

Software Availability: Mar-2021

Platform Notes (Continued)

```
    6:  12  12  12  12  12  12  10  11  32  32  32  32  32  32  32  32
    7:  12  12  12  12  12  12  11  10  32  32  32  32  32  32  32  32
    8:  32  32  32  32  32  32  32  32  10  11  12  12  12  12  12  12
    9:  32  32  32  32  32  32  32  32  11  10  12  12  12  12  12  12
   10:  32  32  32  32  32  32  32  32  12  12  10  11  12  12  12  12
   11:  32  32  32  32  32  32  32  32  12  12  11  10  12  12  12  12
   12:  32  32  32  32  32  32  32  32  12  12  12  12  10  11  12  12
   13:  32  32  32  32  32  32  32  32  12  12  12  12  11  10  12  12
   14:  32  32  32  32  32  32  32  32  12  12  12  12  12  12  10  11
   15:  32  32  32  32  32  32  32  32  12  12  12  12  12  12  11  10

 From /proc/meminfo
    MemTotal:        1056633732 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:            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: Full AMD retpoline,
```

(Continued on next page)

SPEC CPU®2017 Floating Point Rate Result

Copyright 2017-2021 Standard Performance Evaluation Corporation

ASUSTeK Computer Inc.

ASUS RS720A-E11(KMPP-D32) Server System
2.45 GHz, AMD EPYC 7763

SPECrate®2017_fp_base = 663

SPECrate®2017_fp_peak = 710

Platform Notes (Continued)

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

 run-level 3 Nov 1 17:42

 SPEC is set to: /cpu118
    Filesystem     Type  Size  Used Avail Use% Mounted on
    /dev/sda4      xfs   199G   46G  154G  24% /

 From /sys/devices/virtual/dmi/id
    Vendor:         ASUSTeK COMPUTER INC.
    Product:        RS720A-E11-RS12E
    Product Family: Server
    Serial:         123456789012


 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:
     16x Samsung M386A8K40DM2-CWE 64 GB 4 rank 3200
     16x Unknown Unknown

 BIOS:
    BIOS Vendor:      American Megatrends Inc.
    BIOS Version:     0701
    BIOS Date:        08/09/2021
    BIOS Revision:    7.1

 (End of data from sysinfo program)
```

Compiler Version Notes

```
==============================================================================
C                 | 519.lbm_r(base, peak) 538.imagick_r(base, peak)
                  | 544.nab_r(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
------------------------------------------------------------------------------
```

ASUSTeK Computer Inc.

ASUS RS720A-E11(KMPP-D32) Server System
2.45 GHz, AMD EPYC 7763

SPECrate®2017_fp_base = 663

SPECrate®2017_fp_peak = 710

CPU2017 License: 9016		**Test Date:**	Nov-2021
Test Sponsor:	ASUSTeK Computer Inc.	**Hardware Availability:**	Aug-2021
Tested by:	ASUSTeK Computer Inc.	**Software Availability:**	Mar-2021

Compiler Version Notes (Continued)

```
==============================================================================
C++              | 508.namd_r(base, peak) 510.parest_r(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           | 511.povray_r(base, peak) 526.blender_r(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
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 | 507.cactuBSSN_r(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
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          | 503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak)
```

(Continued on next page)

ASUSTeK Computer Inc.

ASUS RS720A-E11(KMPP-D32) Server System
2.45 GHz, AMD EPYC 7763

SPECrate®2017_fp_base = 663

SPECrate®2017_fp_peak = 710

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

Test Date: Nov-2021
Hardware Availability: Aug-2021
Software Availability: Mar-2021

Compiler Version Notes (Continued)

```
                    | 554.roms_r(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      | 521.wrf_r(base, peak) 527.cam4_r(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
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
------------------------------------------------------------------------------
```

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`

SPEC CPU®2017 Floating Point Rate Result

Copyright 2017-2021 Standard Performance Evaluation Corporation

ASUSTeK Computer Inc.

ASUS RS720A-E11(KMPP-D32) Server System
2.45 GHz, AMD EPYC 7763

SPECrate®2017_fp_base = 663

SPECrate®2017_fp_peak = 710

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

Test Date: Nov-2021
Hardware Availability: Aug-2021
Software Availability: Mar-2021

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
519.lbm_r: -DSPEC_LP64
521.wrf_r: -DSPEC_CASE_FLAG -Mbyteswapio -DSPEC_LP64
526.blender_r: -funsigned-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:
-m64 -flto -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 -ffast-math
-march=znver3 -fveclib=AMDLIBM -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 -z muldefs
-lamdlibm -ljemalloc -lflang -lflangrti

C++ benchmarks:
-m64 -std=c++98 -mno-adx -mno-sse4a
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -flto
-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 -ffast-math
-march=znver3 -fveclib=AMDLIBM -mllvm -enable-partial-unswitch
-mllvm -unroll-threshold=100 -finline-aggressive
-flv-function-specialization -mllvm -loop-unswitch-threshold=200000
-mllvm -reroll-loops -mllvm -aggressive-loop-unswitch
-mllvm -extra-vectorizer-passes -mllvm -reduce-array-computations=3
-mllvm -global-vectorize-slp=true -mllvm -convert-pow-exp-to-int=false
-z muldefs -lamdlibm -ljemalloc -lflang -lflangrti

Fortran benchmarks:
-m64 -Wl,-mllvm -Wl,-enable-X86-prefetching

(Continued on next page)

Standard Performance Evaluation Corporation (info@spec.org)

https://www.spec.org/

ASUSTeK Computer Inc.

ASUS RS720A-E11(KMPP-D32) Server System
2.45 GHz, AMD EPYC 7763

SPECrate®2017_fp_base = 663

SPECrate®2017_fp_peak = 710

CPU2017 License: 9016		**Test Date:**	Nov-2021
Test Sponsor:	ASUSTeK Computer Inc.	**Hardware Availability:**	Aug-2021
Tested by:	ASUSTeK Computer Inc.	**Software Availability:**	Mar-2021

Base Optimization Flags (Continued)

Fortran benchmarks (continued):
```
-Wl,-mllvm -Wl,-enable-licm-vrp -flto -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,1,0x1 -O3 -ffast-math
-march=znver3 -fveclib=AMDLIBM -Kieee -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 -lamdlibm -ljemalloc
-lflang -lflangrti
```

Benchmarks using both Fortran and C:
```
-m64 -Wl,-mllvm -Wl,-enable-X86-prefetching
-Wl,-mllvm -Wl,-enable-licm-vrp -flto -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 -ffast-math
-march=znver3 -fveclib=AMDLIBM -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,1,0x1
-Kieee -Mrecursive -mllvm -fuse-tile-inner-loop -funroll-loops
-mllvm -extra-vectorizer-passes -mllvm -lsr-in-nested-loop -z muldefs
-lamdlibm -ljemalloc -lflang -lflangrti
```

Benchmarks using both C and C++:
```
-m64 -std=c++98 -mno-adx -mno-sse4a
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -flto
-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 -ffast-math
-march=znver3 -fveclib=AMDLIBM -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
-z muldefs -lamdlibm -ljemalloc -lflang -lflangrti
```

Benchmarks using Fortran, C, and C++:
```
-m64 -std=c++98 -mno-adx -mno-sse4a
```

(Continued on next page)

SPEC CPU®2017 Floating Point Rate Result

Copyright 2017-2021 Standard Performance Evaluation Corporation

ASUSTeK Computer Inc.

ASUS RS720A-E11(KMPP-D32) Server System
2.45 GHz, AMD EPYC 7763

SPECrate®2017_fp_base = 663

SPECrate®2017_fp_peak = 710

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

Test Date: Nov-2021
Hardware Availability: Aug-2021
Software Availability: Mar-2021

Base Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++ (continued):
```
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -flto
-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 -ffast-math
-march=znver3 -fveclib=AMDLIBM -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,1,0x1 -Kieee -Mrecursive -mllvm -fuse-tile-inner-loop
-funroll-loops -mllvm -lsr-in-nested-loop -z muldefs -lamdlibm
-ljemalloc -lflang -lflangrti
```

Base Other Flags

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

C++ benchmarks:
```
-Wno-unused-command-line-argument
```

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

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

Benchmarks using both C and C++:
```
-Wno-unused-command-line-argument
```

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

Peak Compiler Invocation

C benchmarks:
```
clang
```

(Continued on next page)

Standard Performance Evaluation Corporation (info@spec.org) https://www.spec.org/

ASUSTeK Computer Inc.

ASUS RS720A-E11(KMPP-D32) Server System
2.45 GHz, AMD EPYC 7763

SPECrate®2017_fp_base = 663

SPECrate®2017_fp_peak = 710

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

Test Date: Nov-2021
Hardware Availability: Aug-2021
Software Availability: Mar-2021

Peak Compiler Invocation (Continued)

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
```

Peak Portability Flags

```
Same as Base Portability Flags
```

Peak Optimization Flags

C benchmarks:

```
519.lbm_r: basepeak = yes

538.imagick_r: -m64 -flto -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 -fstruct-layout=7
-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 -lamdlibm -ljemalloc

544.nab_r: -m64 -flto -Wl,-mllvm -Wl,-region-vectorize
-Wl,-mllvm -Wl,-function-specialize -Ofast -march=znver3
-fveclib=AMDLIBM -fstruct-layout=7
-mllvm -unroll-threshold=50 -fremap-arrays
-flv-function-specialization -mllvm -inline-threshold=1000
```

(Continued on next page)

ASUSTeK Computer Inc.

ASUS RS720A-E11(KMPP-D32) Server System
2.45 GHz, AMD EPYC 7763

SPECrate®2017_fp_base = 663

SPECrate®2017_fp_peak = 710

CPU2017 License: 9016		**Test Date:**	Nov-2021
Test Sponsor:	ASUSTeK Computer Inc.	**Hardware Availability:**	Aug-2021
Tested by:	ASUSTeK Computer Inc.	**Software Availability:**	Mar-2021

Peak Optimization Flags (Continued)

544.nab_r (continued):
```
-mllvm -enable-gvn-hoist -mllvm -global-vectorize-slp=true
-mllvm -function-specialize -mllvm -enable-licm-vrp
-mllvm -reduce-array-computations=3 -lamdlibm -ljemalloc
```

C++ benchmarks:

508.namd_r: `-m64 -std=c++98 -mno-adx -mno-sse4a`
```
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false
-Wl,-mllvm -Wl,-enable-licm-vrp -flto
-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 -finline-aggressive
-mllvm -unroll-threshold=100 -flv-function-specialization
-mllvm -enable-licm-vrp -mllvm -reroll-loops
-mllvm -aggressive-loop-unswitch
-mllvm -reduce-array-computations=3
-mllvm -global-vectorize-slp=true -lamdlibm -ljemalloc
```

510.parest_r: `basepeak = yes`

Fortran benchmarks:

503.bwaves_r: `basepeak = yes`

549.fotonik3d_r: `-m64 -Wl,-mllvm -Wl,-enable-X86-prefetching`
```
-Wl,-mllvm -Wl,-enable-licm-vrp -flto
-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 -Kieee -Mrecursive
-mllvm -reduce-array-computations=3
-mllvm -global-vectorize-slp=true -mllvm -enable-licm-vrp
-lamdlibm -ljemalloc -lflang -lflangrti
```

554.roms_r: `-m64 -Wl,-mllvm -Wl,-enable-X86-prefetching`
```
-Wl,-mllvm -Wl,-enable-licm-vrp -flto
-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 -Kieee -Mrecursive
-mllvm -reduce-array-computations=3
-mllvm -global-vectorize-slp=true -mllvm -enable-licm-vrp
-Hz,1,0x1 -mllvm -fuse-tile-inner-loop -lamdlibm
-ljemalloc -lflang -lflangrti
```

(Continued on next page)

ASUSTeK Computer Inc.

ASUS RS720A-E11(KMPP-D32) Server System
2.45 GHz, AMD EPYC 7763

SPECrate®2017_fp_base = 663

SPECrate®2017_fp_peak = 710

CPU2017 License: 9016		**Test Date:**	Nov-2021
Test Sponsor:	ASUSTeK Computer Inc.	**Hardware Availability:**	Aug-2021
Tested by:	ASUSTeK Computer Inc.	**Software Availability:**	Mar-2021

Peak Optimization Flags (Continued)

Benchmarks using both Fortran and C:

521.wrf_r: basepeak = yes

527.cam4_r: -m64 -Wl,-mllvm -Wl,-enable-X86-prefetching
-Wl,-mllvm -Wl,-enable-licm-vrp -flto
-Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-force-vector-interleave=1 -Ofast
-march=znver3 -fveclib=AMDLIBM -fstruct-layout=7
-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 -O3 -ffast-math
-funroll-loops -mllvm -extra-vectorizer-passes
-mllvm -lsr-in-nested-loop -Mrecursive -lamdlibm
-ljemalloc -lflang -lflangrti

Benchmarks using both C and C++:
-m64 -std=c++98 -mno-adx -mno-sse4a
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -Wl,-mllvm -Wl,-enable-licm-vrp
-flto -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 -fstruct-layout=7 -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
-finline-aggressive -mllvm -unroll-threshold=100 -mllvm -reroll-loops
-mllvm -aggressive-loop-unswitch -lamdlibm -ljemalloc

Benchmarks using Fortran, C, and C++:
-m64 -std=c++98 -mno-adx -mno-sse4a
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -Wl,-mllvm -Wl,-enable-licm-vrp
-flto -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 -fstruct-layout=7 -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
-mllvm -unroll-threshold=100 -mllvm -loop-unswitch-threshold=200000

(Continued on next page)

Standard Performance Evaluation Corporation (info@spec.org)   https://www.spec.org/

ASUSTeK Computer Inc.

ASUS RS720A-E11(KMPP-D32) Server System
2.45 GHz, AMD EPYC 7763

SPECrate®2017_fp_base = 663

SPECrate®2017_fp_peak = 710

CPU2017 License: 9016		**Test Date:**	Nov-2021
Test Sponsor:	ASUSTeK Computer Inc.	**Hardware Availability:**	Aug-2021
Tested by:	ASUSTeK Computer Inc.	**Software Availability:**	Mar-2021

Peak Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++ (continued):
```
-finline-aggressive -mllvm -reroll-loops
-mllvm -aggressive-loop-unswitch -mllvm -extra-vectorizer-passes
-mllvm -convert-pow-exp-to-int=false -Kieee -Mrecursive -lamdlibm
-ljemalloc -lflang -lflangrti
```

Peak Other Flags

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

C++ benchmarks:
```
-Wno-unused-command-line-argument
```

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

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

Benchmarks using both C and C++:
```
-Wno-unused-command-line-argument
```

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

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/ASUSTekPlatform-Settings-AMD-Milan-V1.4.html
http://www.spec.org/cpu2017/flags/aocc300-flags-A1.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/ASUSTekPlatform-Settings-AMD-Milan-V1.4.xml
http://www.spec.org/cpu2017/flags/aocc300-flags-A1.xml

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

Tested with SPEC CPU®2017 v1.1.8 on 2021-11-02 09:28:38-0400.
Report generated on 2021-12-07 16:59:27 by CPU2017 PDF formatter v6442.
Originally published on 2021-12-07.