



SPEC CPU®2017 Floating Point Rate Result

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Supermicro

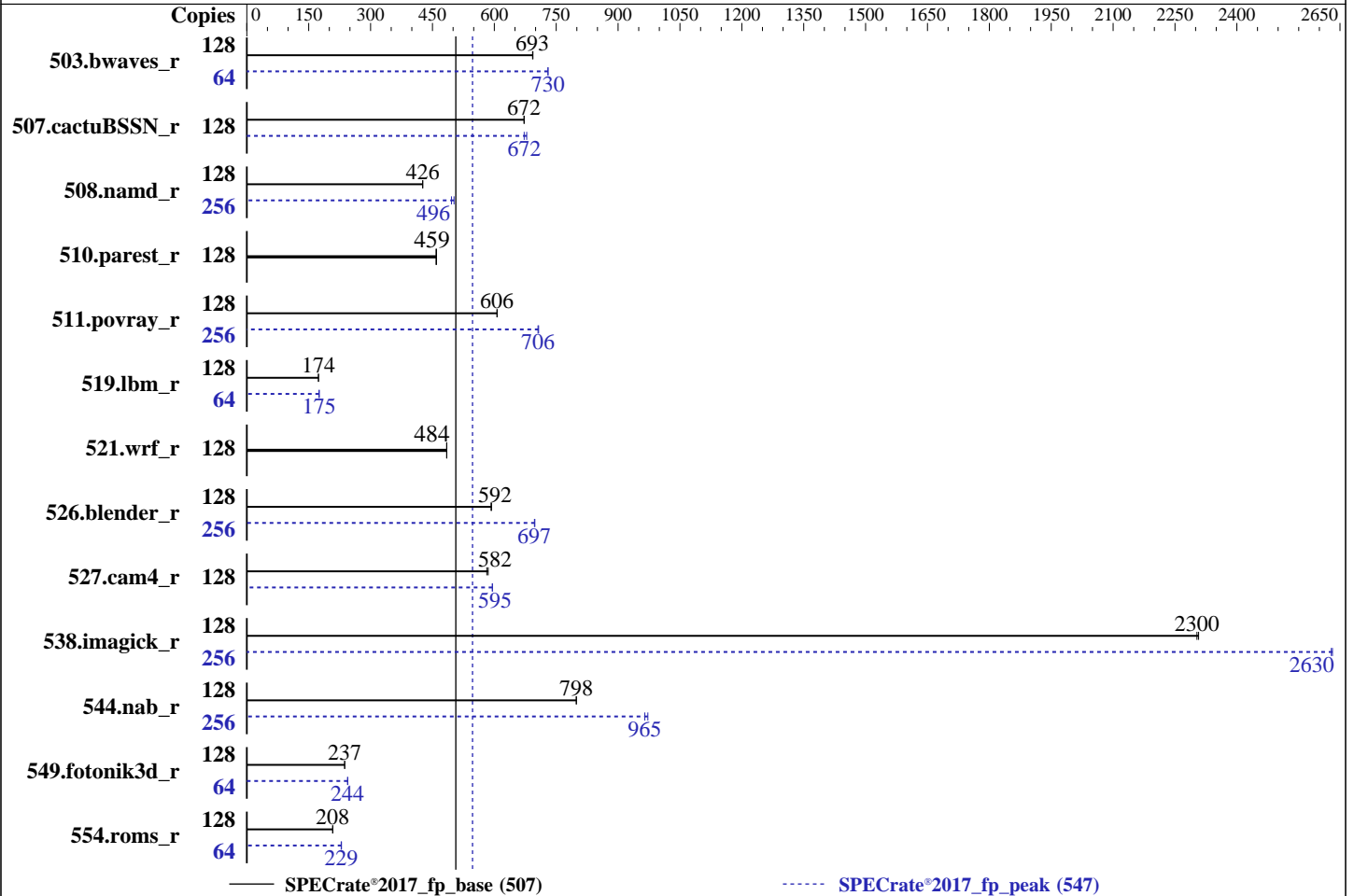
A+ Server 2124BT-HNTR
(H12DST-B , AMD EPYC 7702)

SPECrate®2017_fp_base = 507

SPECrate®2017_fp_peak = 547

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

Test Date: Oct-2021
Hardware Availability: Aug-2019
Software Availability: Sep-2021



Hardware

CPU Name: AMD EPYC 7702
 Max MHz: 3350
 Nominal: 2000
 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, 16 MB shared / 4 cores
 Other: None
 Memory: 1 TB (16 x 64 GB 2Rx4 PC4-3200AA-R)
 Storage: 1 x 200 GB SATA III SSD
 Other: None

Software

OS: Ubuntu 20.04.3 LTS
 Kernel 5.4.0-88-generic
 Compiler: C/C++/Fortran: Version 3.0.0 of AOCC
 Parallel: No
 Firmware: Version 2.2 released Aug-2021
 File System: ext4
 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 set to prefer performance at the cost of additional power usage.



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Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
503.bwaves_r	128	1851	694	<u>1853</u>	<u>693</u>			64	879	730	<u>879</u>	<u>730</u>		
507.cactuBSSN_r	128	<u>241</u>	<u>672</u>	241	672			128	239	678	<u>241</u>	<u>672</u>		
508.namd_r	128	285	426	<u>285</u>	<u>426</u>			256	<u>490</u>	<u>496</u>	484	502		
510.parest_r	128	<u>730</u>	<u>459</u>	728	460			128	<u>730</u>	<u>459</u>	728	460		
511.povray_r	128	<u>493</u>	<u>606</u>	492	607			256	<u>847</u>	<u>706</u>	845	707		
519.lbm_r	128	777	174	<u>777</u>	<u>174</u>			64	<u>385</u>	<u>175</u>	385	175		
521.wrf_r	128	592	485	<u>592</u>	<u>484</u>			128	592	485	<u>592</u>	<u>484</u>		
526.blender_r	128	329	593	<u>329</u>	<u>592</u>			256	<u>559</u>	<u>697</u>	558	698		
527.cam4_r	128	383	585	<u>385</u>	<u>582</u>			128	<u>376</u>	<u>595</u>	376	595		
538.imagick_r	128	<u>138</u>	<u>2300</u>	138	2310			256	242	2630	<u>242</u>	<u>2630</u>		
544.nab_r	128	<u>270</u>	<u>798</u>	270	799			256	443	972	<u>447</u>	<u>965</u>		
549.fotonik3d_r	128	<u>2103</u>	<u>237</u>	2103	237			64	1020	244	<u>1021</u>	<u>244</u>		
554.roms_r	128	976	208	<u>978</u>	<u>208</u>			64	<u>445</u>	<u>229</u>	443	229		

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

Compiler Notes

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

Submit Notes

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

Operating System Notes

'ulimit -s unlimited' was used to set environment stack size 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.

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Operating System Notes (Continued)

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, 'echo always > /sys/kernel/mm/transparent_hugepage/enabled' and 'echo always > /sys/kernel/mm/transparent_hugepage/defrag' run as root.

Environment Variables Notes

Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH =
"/home/cpu2017/amd_rate_aocc300_milan_B_lib/lib;/home/cpu2017/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 Settings:
Determinism Control = Manual
Determinism Slider = Power
cTDP Control = Manual
cTDP = 200
Package Power Limit Control = Manual
Package Power Limit = 200
APBDIS = 1
NUMA Nodes Per Socket = NPS4

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Platform Notes (Continued)

sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acafc64d
running on h12dst-7702 Sat Oct 2 00:48:25 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 7702 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 2.34:
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):                256
On-line CPU(s) list:   0-255
Thread(s) per core:    2
Core(s) per socket:    64
Socket(s):             2
NUMA node(s):         32
Vendor ID:             AuthenticAMD
CPU family:            23
Model:                 49
Model name:            AMD EPYC 7702 64-Core Processor
Stepping:              0
Frequency boost:       enabled
CPU MHz:               2467.770
CPU max MHz:           2000.0000
CPU min MHz:           1500.0000
BogoMIPS:              4000.19
Virtualization:        AMD-V
L1d cache:             4 MiB
```

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Platform Notes (Continued)

L1i cache:	4 MiB
L2 cache:	64 MiB
L3 cache:	512 MiB
NUMA node0 CPU(s):	0-3,128-131
NUMA node1 CPU(s):	4-7,132-135
NUMA node2 CPU(s):	8-11,136-139
NUMA node3 CPU(s):	12-15,140-143
NUMA node4 CPU(s):	16-19,144-147
NUMA node5 CPU(s):	20-23,148-151
NUMA node6 CPU(s):	24-27,152-155
NUMA node7 CPU(s):	28-31,156-159
NUMA node8 CPU(s):	32-35,160-163
NUMA node9 CPU(s):	36-39,164-167
NUMA node10 CPU(s):	40-43,168-171
NUMA node11 CPU(s):	44-47,172-175
NUMA node12 CPU(s):	48-51,176-179
NUMA node13 CPU(s):	52-55,180-183
NUMA node14 CPU(s):	56-59,184-187
NUMA node15 CPU(s):	60-63,188-191
NUMA node16 CPU(s):	64-67,192-195
NUMA node17 CPU(s):	68-71,196-199
NUMA node18 CPU(s):	72-75,200-203
NUMA node19 CPU(s):	76-79,204-207
NUMA node20 CPU(s):	80-83,208-211
NUMA node21 CPU(s):	84-87,212-215
NUMA node22 CPU(s):	88-91,216-219
NUMA node23 CPU(s):	92-95,220-223
NUMA node24 CPU(s):	96-99,224-227
NUMA node25 CPU(s):	100-103,228-231
NUMA node26 CPU(s):	104-107,232-235
NUMA node27 CPU(s):	108-111,236-239
NUMA node28 CPU(s):	112-115,240-243
NUMA node29 CPU(s):	116-119,244-247
NUMA node30 CPU(s):	120-123,248-251
NUMA node31 CPU(s):	124-127,252-255
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/swaps barriers and __user pointer sanitization
Vulnerability Spectre v2:	Mitigation; Full AMD retpoline, IBPB conditional, IBRS_FW, STIBP conditional, RSB filling
Vulnerability Srbds:	Not affected
Vulnerability Tsx async abort:	Not affected

(Continued on next page)



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Platform Notes (Continued)

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 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 hw_pstate sme ssbd mba sev ibrs ibpb stibp vmmcall fsgsbase bmi1 avx2 smep bmi2 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 avic v_vmsave_vmload vgif umip rdpid overflow_recov succor smca

From lscpu --cache:

NAME	ONE-SIZE	ALL-SIZE	WAYS	TYPE	LEVEL
L1d	32K	4M	8	Data	1
L1i	32K	4M	8	Instruction	1
L2	512K	64M	8	Unified	2
L3	16M	512M	16	Unified	3

/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: 32 nodes (0-31)
node 0 cpus: 0 1 2 3 128 129 130 131
node 0 size: 32127 MB
node 0 free: 31693 MB
node 1 cpus: 4 5 6 7 132 133 134 135
node 1 size: 32254 MB
node 1 free: 31802 MB
node 2 cpus: 8 9 10 11 136 137 138 139
node 2 size: 32254 MB
node 2 free: 31854 MB
node 3 cpus: 12 13 14 15 140 141 142 143
node 3 size: 32253 MB
node 3 free: 31844 MB
node 4 cpus: 16 17 18 19 144 145 146 147
node 4 size: 32254 MB
node 4 free: 31854 MB
node 5 cpus: 20 21 22 23 148 149 150 151
node 5 size: 32229 MB
node 5 free: 31818 MB
node 6 cpus: 24 25 26 27 152 153 154 155
node 6 size: 32254 MB
node 6 free: 31848 MB

```

(Continued on next page)



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Platform Notes (Continued)

```

node 7 cpus: 28 29 30 31 156 157 158 159
node 7 size: 32253 MB
node 7 free: 31859 MB
node 8 cpus: 32 33 34 35 160 161 162 163
node 8 size: 32254 MB
node 8 free: 31865 MB
node 9 cpus: 36 37 38 39 164 165 166 167
node 9 size: 32254 MB
node 9 free: 31868 MB
node 10 cpus: 40 41 42 43 168 169 170 171
node 10 size: 32254 MB
node 10 free: 31868 MB
node 11 cpus: 44 45 46 47 172 173 174 175
node 11 size: 32253 MB
node 11 free: 31866 MB
node 12 cpus: 48 49 50 51 176 177 178 179
node 12 size: 32254 MB
node 12 free: 31849 MB
node 13 cpus: 52 53 54 55 180 181 182 183
node 13 size: 32254 MB
node 13 free: 31860 MB
node 14 cpus: 56 57 58 59 184 185 186 187
node 14 size: 32254 MB
node 14 free: 31840 MB
node 15 cpus: 60 61 62 63 188 189 190 191
node 15 size: 32241 MB
node 15 free: 31847 MB
node 16 cpus: 64 65 66 67 192 193 194 195
node 16 size: 32254 MB
node 16 free: 31804 MB
node 17 cpus: 68 69 70 71 196 197 198 199
node 17 size: 32254 MB
node 17 free: 31851 MB
node 18 cpus: 72 73 74 75 200 201 202 203
node 18 size: 32254 MB
node 18 free: 31852 MB
node 19 cpus: 76 77 78 79 204 205 206 207
node 19 size: 32253 MB
node 19 free: 31835 MB
node 20 cpus: 80 81 82 83 208 209 210 211
node 20 size: 32254 MB
node 20 free: 31865 MB
node 21 cpus: 84 85 86 87 212 213 214 215
node 21 size: 32254 MB
node 21 free: 31864 MB
node 22 cpus: 88 89 90 91 216 217 218 219
node 22 size: 32254 MB

```

(Continued on next page)



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```

node 22 free: 31870 MB
node 23 cpus: 92 93 94 95 220 221 222 223
node 23 size: 32253 MB
node 23 free: 31866 MB
node 24 cpus: 96 97 98 99 224 225 226 227
node 24 size: 32254 MB
node 24 free: 31865 MB
node 25 cpus: 100 101 102 103 228 229 230 231
node 25 size: 32254 MB
node 25 free: 31871 MB
node 26 cpus: 104 105 106 107 232 233 234 235
node 26 size: 32254 MB
node 26 free: 31860 MB
node 27 cpus: 108 109 110 111 236 237 238 239
node 27 size: 32253 MB
node 27 free: 31859 MB
node 28 cpus: 112 113 114 115 240 241 242 243
node 28 size: 32254 MB
node 28 free: 31866 MB
node 29 cpus: 116 117 118 119 244 245 246 247
node 29 size: 32254 MB
node 29 free: 31867 MB
node 30 cpus: 120 121 122 123 248 249 250 251
node 30 size: 32254 MB
node 30 free: 31864 MB
node 31 cpus: 124 125 126 127 252 253 254 255
node 31 size: 32250 MB
node 31 free: 31862 MB
node distances:
node 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
0: 10 11 11 11 12 12 12 12 12 12 12 12 12 12 12 32 32 32 32
32 32 32 32 32 32 32 32 32 32 32 32 32 32
1: 11 10 11 11 12 12 12 12 12 12 12 12 12 12 12 32 32 32 32
32 32 32 32 32 32 32 32 32 32 32 32 32
2: 11 11 10 11 12 12 12 12 12 12 12 12 12 12 12 32 32 32 32
32 32 32 32 32 32 32 32 32 32 32 32 32
3: 11 11 11 10 12 12 12 12 12 12 12 12 12 12 12 32 32 32 32
32 32 32 32 32 32 32 32 32 32 32 32 32
4: 12 12 12 12 10 11 11 11 12 12 12 12 12 12 12 32 32 32 32
32 32 32 32 32 32 32 32 32 32 32 32 32
5: 12 12 12 12 11 10 11 11 12 12 12 12 12 12 12 32 32 32 32
32 32 32 32 32 32 32 32 32 32 32 32
6: 12 12 12 12 11 11 10 11 12 12 12 12 12 12 12 32 32 32 32
32 32 32 32 32 32 32 32 32 32 32 32
7: 12 12 12 12 11 11 11 10 12 12 12 12 12 12 12 32 32 32 32
32 32 32 32 32 32 32 32 32 32 32 32

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8:	12	12	12	12	12	12	12	12	12	10	11	11	11	12	12	12	12	32	32	32	32	
32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	
9:	12	12	12	12	12	12	12	12	12	11	10	11	11	12	12	12	12	32	32	32	32	
32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	
10:	12	12	12	12	12	12	12	12	12	11	11	10	11	12	12	12	12	32	32	32	32	
32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	
11:	12	12	12	12	12	12	12	12	12	11	11	11	10	12	12	12	12	32	32	32	32	
32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	
12:	12	12	12	12	12	12	12	12	12	12	12	12	12	12	10	11	11	11	32	32	32	32
32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	
13:	12	12	12	12	12	12	12	12	12	12	12	12	12	11	10	11	11	32	32	32	32	
32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	
14:	12	12	12	12	12	12	12	12	12	12	12	12	12	11	11	10	11	32	32	32	32	
32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	
15:	12	12	12	12	12	12	12	12	12	12	12	12	12	11	11	11	10	32	32	32	32	
32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	
16:	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	10	11	11	11	11	
12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	
17:	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	11	10	11	11	
12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	
18:	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	11	11	10	11	
12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	
19:	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	11	11	11	10	
12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	
20:	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	12	12	12	12	
10	11	11	11	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	
21:	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	12	12	12	12	
11	10	11	11	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	
22:	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	12	12	12	12	
11	11	10	11	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	
23:	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	12	12	12	12	
11	11	11	10	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	
24:	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	12	12	12	12	
12	12	12	12	10	11	11	11	12	12	12	12	12	12	12	12	12	12	12	12	12	12	
25:	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	12	12	12	12	
12	12	12	12	11	10	11	11	12	12	12	12	12	12	12	12	12	12	12	12	12	12	
26:	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	12	12	12	12	
12	12	12	12	11	11	10	11	12	12	12	12	12	12	12	12	12	12	12	12	12	12	
27:	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	12	12	12	12	
12	12	12	12	11	11	11	10	12	12	12	12	12	12	12	12	12	12	12	12	12	12	
28:	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	12	12	12	12	
12	12	12	12	12	12	12	12	10	11	11	11	11	11	11	11	11	11	12	12	12	12	
29:	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	12	12	12	12	
12	12	12	12	12	12	12	12	11	10	11	11	11	11	11	11	11	11	12	12	12	12	
30:	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	12	12	12	12	
12	12	12	12	12	12	12	12	12	11	11	10	11	11	11	11	11	11	12	12	12	12	
31:	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	12	12	12	12	

(Continued on next page)



SPEC CPU®2017 Floating Point Rate Result

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Supermicro

A+ Server 2124BT-HNTR
(H12DST-B , AMD EPYC 7702)

SPECrate®2017_fp_base = 507

SPECrate®2017_fp_peak = 547

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

Test Date: Oct-2021
Hardware Availability: Aug-2019
Software Availability: Sep-2021

Platform Notes (Continued)

12 12 12 12 12 12 12 12 11 11 11 10

From /proc/meminfo

MemTotal: 1056724908 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

/sbin/tuned-adm active

Current active profile: throughput-performance

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

/usr/bin/lsb_release -d

Ubuntu 20.04.3 LTS

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

debian_version: bullseye/sid

os-release:

NAME="Ubuntu"
VERSION="20.04.3 LTS (Focal Fossa)"
ID=ubuntu
ID_LIKE=debian
PRETTY_NAME="Ubuntu 20.04.3 LTS"
VERSION_ID="20.04"
HOME_URL="https://www.ubuntu.com/"
SUPPORT_URL="https://help.ubuntu.com/"

uname -a:

Linux h12dst-7702 5.4.0-88-generic #99-Ubuntu SMP Thu Sep 23 17:29:00 UTC 2021 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, IBPB: conditional, IBRS_FW, STIBP: conditional, RSB filling

(Continued on next page)



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Platform Notes (Continued)

CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
CVE-2019-11135 (TSX Asynchronous Abort): Not affected

run-level 3 Oct 1 17:30

SPEC is set to: /home/cpu2017

Filesystem	Type	Size	Used	Avail	Use%	Mounted on
/dev/sda3	ext4	178G	18G	152G	11%	/

```
From /sys/devices/virtual/dmi/id
Vendor:          Supermicro
Product:         Super Server
Serial:          0123456789
```

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 SK Hynix HMAA8GR7AJR4N-XN 64 GB 2 rank 3200

```
BIOS:
  BIOS Vendor:      American Megatrends Inc.
  BIOS Version:     2.2
  BIOS Date:        08/31/2021
  BIOS Revision:    5.14
```

(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
=====
```

```
=====
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
```

(Continued on next page)



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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

=====
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)
| 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)

(Continued on next page)



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Software Availability: Sep-2021

Compiler Version Notes (Continued)

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

Base Portability Flags

503.bwaves_r: -DSPEC_LP64

(Continued on next page)



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Base Portability Flags (Continued)

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
-Wl,-mllvm -Wl,-enable-licm-vrp -flto -Wl,-mllvm -Wl,-region-vectorize

(Continued on next page)



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CPU2017 License: 001176
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Tested by: Supermicro

Test Date: Oct-2021
Hardware Availability: Aug-2019
Software Availability: Sep-2021

Base Optimization Flags (Continued)

Fortran benchmarks (continued):

```
-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
-freemap-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
-freemap-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
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -flto
```

(Continued on next page)



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Base Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++ (continued):

```
-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)



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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: -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
```

538.imagick_r: Same as 519.lbm_r

```
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
-mllvm -enable-gvn-hoist -mllvm -global-vectorize-slp=true
-mllvm -function-specialize -mllvm -enable-licm-vrp
```

(Continued on next page)



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Peak Optimization Flags (Continued)

544.nab_r (continued):

```
-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: -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
```

549.fotonik3d_r: Same as 503.bwaves_r

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)



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Tested by: Supermicro

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Software Availability: Sep-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
-finline-aggressive -mllvm -reroll-loops
-mllvm -aggressive-loop-unswitch -mllvm -extra-vectorizer-passes
```

(Continued on next page)



SPEC CPU®2017 Floating Point Rate Result

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Supermicro

A+ Server 2124BT-HNTR
(H12DST-B , AMD EPYC 7702)

SPECrate®2017_fp_base = 507

SPECrate®2017_fp_peak = 547

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

Test Date: Oct-2021
Hardware Availability: Aug-2019
Software Availability: Sep-2021

Peak Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++ (continued):

```
-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/aocc300-flags-B2.html>

<http://www.spec.org/cpu2017/flags/Supermicro-Platform-Settings-V1.2-Rome-revC.html>

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

<http://www.spec.org/cpu2017/flags/aocc300-flags-B2.xml>

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

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