



# SPEC CPU®2017 Integer Rate Result

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## Supermicro

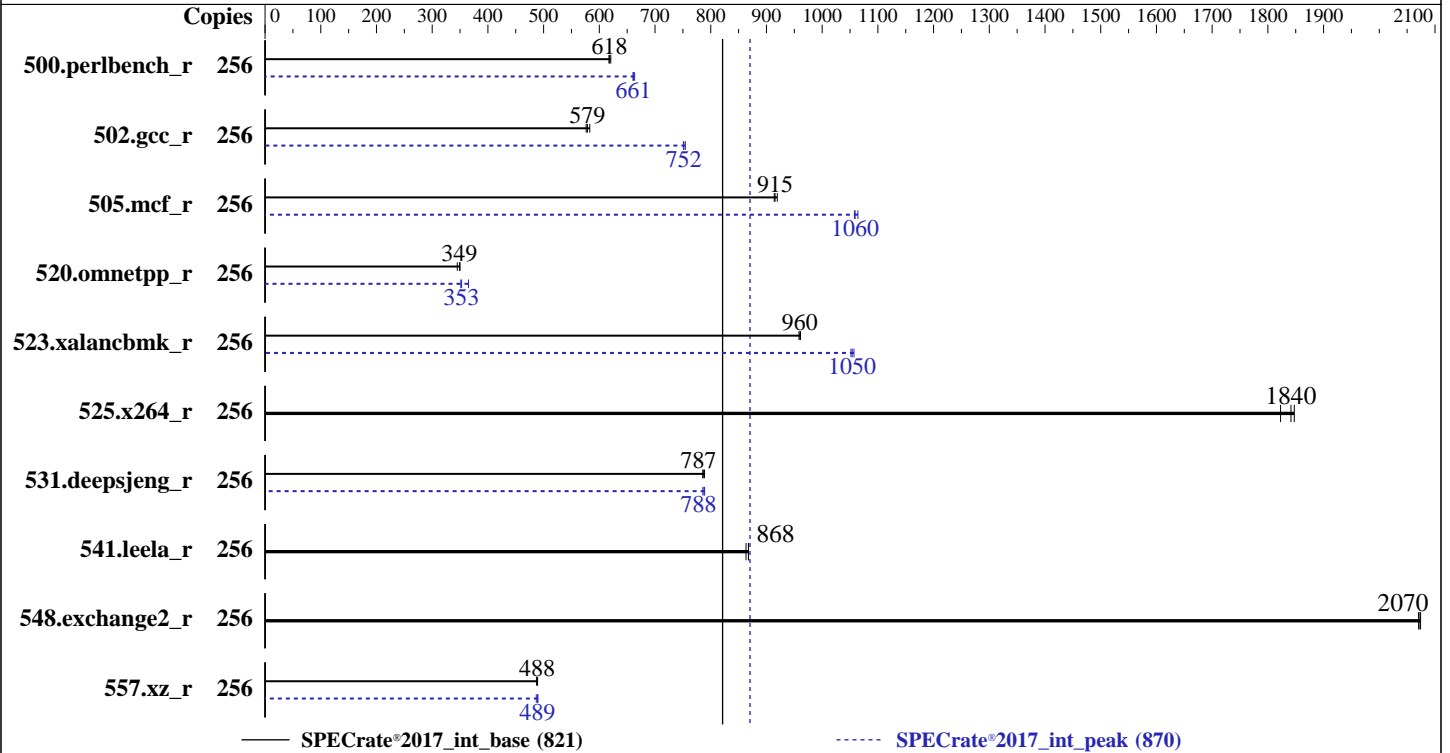
A+ Server 2024US-TRT  
(H12DSU-iN , AMD EPYC 7763)

SPECrate®2017\_int\_base = 821

SPECrate®2017\_int\_peak = 870

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

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



### 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: 2 TB (16 x 128 GB 4Rx4 PC4-3200AA-L)  
 Storage: 1 x 200 GB SATA III SSD  
 Other: None

### Software

OS: Ubuntu 20.04.1 LTS  
 Kernel 5.4.0-66-generic  
 Compiler: C/C++/Fortran: Version 3.0.0 of AOCC  
 Parallel: No  
 Firmware: Version T20210220153821 released Feb-2021  
 File System: ext4  
 System State: Run level 5 (multi-user with GUI)  
 Base Pointers: 64-bit  
 Peak Pointers: 32/64-bit  
 Other: jemalloc: jemalloc memory allocator library v5.2.0  
 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
500.perlbench_r	256	657	621	660	617	<b>659</b>	<b>618</b>	256	<b>616</b>	<b>661</b>	617	660	614	663
502.gcc_r	256	<b>626</b>	<b>579</b>	622	583	629	576	256	<b>482</b>	<b>752</b>	480	754	483	751
505.mcf_r	256	450	919	453	914	<b>452</b>	<b>915</b>	256	391	1060	389	1060	<b>391</b>	<b>1060</b>
520.omnetpp_r	256	973	345	960	350	<b>962</b>	<b>349</b>	256	<b>952</b>	<b>353</b>	920	365	956	351
523.xalancbmk_r	256	281	961	<b>282</b>	<b>960</b>	282	958	256	<b>257</b>	<b>1050</b>	256	1060	257	1050
525.x264_r	256	243	1850	<b>243</b>	<b>1840</b>	246	1820	256	243	1850	<b>243</b>	<b>1840</b>	246	1820
531.deepsjeng_r	256	372	789	373	786	<b>373</b>	<b>787</b>	256	373	786	<b>372</b>	<b>788</b>	372	789
541.leela_r	256	489	868	<b>489</b>	<b>868</b>	491	863	256	489	868	<b>489</b>	<b>868</b>	491	863
548.exchange2_r	256	<b>324</b>	<b>2070</b>	323	2070	324	2070	256	<b>324</b>	<b>2070</b>	323	2070	324	2070
557.xz_r	256	567	487	<b>566</b>	<b>488</b>	565	489	256	565	490	568	487	<b>565</b>	<b>489</b>

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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>

'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
```

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## Operating System Notes (Continued)

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 =  
    "/root/spec2017/amd_rate_aocc300_milan_A_lib/64:/root/spec2017/amd_rate_  
    aocc300_milan_A_lib/32:"  
MALLOC_CONF = "retain:true"
```

Environment variables set by runcpu during the 523.xalancbmk\_r peak run:

```
MALLOC_CONF = "thp:never"
```

## General Notes

Binaries were compiled on a system with 2x AMD EPYC 7742 CPU + 512GiB 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 v9.1.0 in Ubuntu 19.04 with -O3 -znver2 -flto  
jemalloc 5.2.0 is available here:

<https://github.com/jemalloc/jemalloc/releases/download/5.2.0/jemalloc-5.2.0.tar.bz2>

## Platform Notes

BIOS Settings:

Determinism Control = Manual

Determinism Slider = Power

cTDP Control = Manual

cTDP = 280

Package Power Limit Control = Manual

Package Power Limit = 280

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### Platform Notes (Continued)

APBDIS = 1  
NUMA Nodes Per Socket = NPS4

sysinfo program /root/spec2017/bin/sysinfo  
Rev: r6365 of 2019-08-21 295195f888a3d7edble6e46a485a0011  
running on milanspecter Sun Mar 21 18:26:24 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:  
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  
Frequency boost: enabled  
CPU MHz: 1546.449  
CPU max MHz: 2450.0000  
CPU min MHz: 1500.0000  
BogoMIPS: 4900.44

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### Platform Notes (Continued)

```

Virtualization:          AMD-V
L1d cache:              4 MiB
L1i cache:              4 MiB
L2 cache:               64 MiB
L3 cache:               512 MiB
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
Vulnerability Itlb multihit: Not affected
Vulnerability L1tf:     Not affected
Vulnerability Mds:     Not affected
Vulnerability Meltdown: Not affected
Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl and seccomp
Vulnerability Spectre v1: Mitigation; usercopy/swapgs barriers and __user pointer sanitization
Vulnerability Spectre v2: Mitigation; Full AMD retpoline, IBPB conditional, IBRS_FW, STIBP always-on, RSB filling
Vulnerability Srbds:    Not affected
Vulnerability Tsx async abort: Not affected
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 erms 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

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### Platform Notes (Continued)

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: 128890 MB
node 0 free: 128454 MB
node 1 cpus: 8 9 10 11 12 13 14 15 136 137 138 139 140 141 142 143
node 1 size: 129019 MB
node 1 free: 128680 MB
node 2 cpus: 16 17 18 19 20 21 22 23 144 145 146 147 148 149 150 151
node 2 size: 129020 MB
node 2 free: 128123 MB
node 3 cpus: 24 25 26 27 28 29 30 31 152 153 154 155 156 157 158 159
node 3 size: 129019 MB
node 3 free: 128743 MB
node 4 cpus: 32 33 34 35 36 37 38 39 160 161 162 163 164 165 166 167
node 4 size: 129020 MB
node 4 free: 128717 MB
node 5 cpus: 40 41 42 43 44 45 46 47 168 169 170 171 172 173 174 175
node 5 size: 129019 MB
node 5 free: 128692 MB
node 6 cpus: 48 49 50 51 52 53 54 55 176 177 178 179 180 181 182 183
node 6 size: 129020 MB
node 6 free: 128719 MB
node 7 cpus: 56 57 58 59 60 61 62 63 184 185 186 187 188 189 190 191
node 7 size: 129007 MB
node 7 free: 128704 MB
node 8 cpus: 64 65 66 67 68 69 70 71 192 193 194 195 196 197 198 199
node 8 size: 129020 MB
node 8 free: 128701 MB
node 9 cpus: 72 73 74 75 76 77 78 79 200 201 202 203 204 205 206 207
node 9 size: 129019 MB
node 9 free: 128783 MB
node 10 cpus: 80 81 82 83 84 85 86 87 208 209 210 211 212 213 214 215
node 10 size: 129020 MB
node 10 free: 128779 MB
node 11 cpus: 88 89 90 91 92 93 94 95 216 217 218 219 220 221 222 223
node 11 size: 129019 MB
node 11 free: 128782 MB
node 12 cpus: 96 97 98 99 100 101 102 103 224 225 226 227 228 229 230 231
node 12 size: 128996 MB
node 12 free: 128714 MB
node 13 cpus: 104 105 106 107 108 109 110 111 232 233 234 235 236 237 238 239
node 13 size: 129019 MB
node 13 free: 128765 MB

```

(Continued on next page)



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### Platform Notes (Continued)

```

node 14 cpus: 112 113 114 115 116 117 118 119 240 241 242 243 244 245 246 247
node 14 size: 129020 MB
node 14 free: 128704 MB
node 15 cpus: 120 121 122 123 124 125 126 127 248 249 250 251 252 253 254 255
node 15 size: 129017 MB
node 15 free: 128771 MB
node distances:
node  0  1  2  3  4  5  6  7  8  9 10 11 12 13 14 15
 0:  10 11 11 11 11 11 11 11 32 32 32 32 32 32 32 32
 1:  11 10 11 11 11 11 11 11 32 32 32 32 32 32 32 32
 2:  11 11 10 11 11 11 11 11 32 32 32 32 32 32 32 32
 3:  11 11 11 10 11 11 11 11 32 32 32 32 32 32 32 32
 4:  11 11 11 11 10 11 11 11 32 32 32 32 32 32 32 32
 5:  11 11 11 11 11 10 11 11 32 32 32 32 32 32 32 32
 6:  11 11 11 11 11 11 10 11 32 32 32 32 32 32 32 32
 7:  11 11 11 11 11 11 11 10 32 32 32 32 32 32 32 32
 8:  32 32 32 32 32 32 32 32 10 11 11 11 11 11 11 11
 9:  32 32 32 32 32 32 32 32 11 10 11 11 11 11 11 11
10:  32 32 32 32 32 32 32 32 11 11 10 11 11 11 11 11
11:  32 32 32 32 32 32 32 32 11 11 11 10 11 11 11 11
12:  32 32 32 32 32 32 32 32 11 11 11 11 10 11 11 11
13:  32 32 32 32 32 32 32 32 11 11 11 11 11 10 11 11
14:  32 32 32 32 32 32 32 32 11 11 11 11 11 11 10 11
15:  32 32 32 32 32 32 32 32 11 11 11 11 11 11 11 10

```

```

From /proc/meminfo
MemTotal:      2113689080 kB
HugePages_Total:      0
Hugepagesize:    2048 kB

```

```

/usr/bin/lsb_release -d
Ubuntu 20.04.1 LTS

```

```

From /etc/*release* /etc/*version*
debian_version: bullseye/sid
os-release:
NAME="Ubuntu"
VERSION="20.04.1 LTS (Focal Fossa)"
ID=ubuntu
ID_LIKE=debian
PRETTY_NAME="Ubuntu 20.04.1 LTS"
VERSION_ID="20.04"
HOME_URL="https://www.ubuntu.com/"
SUPPORT_URL="https://help.ubuntu.com/"

```

```

uname -a:
Linux milanspecter 5.4.0-66-generic #74-Ubuntu SMP Wed Jan 27 22:54:38 UTC 2021 x86_64

```

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### Platform Notes (Continued)

x86\_64 x86\_64 GNU/Linux

Kernel self-reported vulnerability status:

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: always-on, RSB filling
srbds:	Not affected
tsx_async_abort:	Not affected

run-level 5 Mar 21 18:14

SPEC is set to: /root/spec2017

Filesystem	Type	Size	Used	Avail	Use%	Mounted on
/dev/mapper/ubuntu--vg-ubuntu--lv	ext4	196G	18G	168G	10%	/

From /sys/devices/virtual/dmi/id

BIOS: American Megatrends Inc. T20210220153821 02/20/2021  
 Vendor: Supermicro  
 Product: AS -2024US-TRT  
 Serial: S412679X0C11200

Additional information from dmidecode follows. WARNING: Use caution when you interpret this section. The 'dmidecode' program reads system data which is "intended to allow hardware to be accurately determined", but the intent may not be met, as there are frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.

Memory:

16x Micron Technology 72ASS16G72LZ-3G2B3 128 GB 4 rank 3200  
 16x NO DIMM Unknown

(End of data from sysinfo program)

### Compiler Version Notes

```
=====
C      | 502.gcc_r(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: i386-unknown-linux-gnu  
Thread model: posix  
InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin

=====  
C | 500.perlbench\_r(base, peak) 502.gcc\_r(base) 505.mcf\_r(base, peak)  
| 525.x264\_r(base, peak) 557.xz\_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 | 502.gcc\_r(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: i386-unknown-linux-gnu  
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=====  
C | 500.perlbench\_r(base, peak) 502.gcc\_r(base) 505.mcf\_r(base, peak)  
| 525.x264\_r(base, peak) 557.xz\_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++ | 523.xalancbmk\_r(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: i386-unknown-linux-gnu  
Thread model: posix  
InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin

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=====  
C++ | 520.omnetpp\_r(base, peak) 523.xalanbmk\_r(base)  
| 531.deepsjeng\_r(base, peak) 541.leela\_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++ | 523.xalanbmk\_r(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: i386-unknown-linux-gnu  
Thread model: posix  
InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin  
=====

=====  
C++ | 520.omnetpp\_r(base, peak) 523.xalanbmk\_r(base)  
| 531.deepsjeng\_r(base, peak) 541.leela\_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 | 548.exchange2\_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  
=====



# SPEC CPU®2017 Integer Rate Result

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## Supermicro

A+ Server 2024US-TRT  
(H12DSU-iN , AMD EPYC 7763)

SPECrate®2017\_int\_base = 821

SPECrate®2017\_int\_peak = 870

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

**Test Date:** Mar-2021  
**Hardware Availability:** Mar-2021  
**Software Availability:** Mar-2021

## Base Compiler Invocation

C benchmarks:

clang

C++ benchmarks:

clang++

Fortran benchmarks:

flang

## Base Portability Flags

```
500.perlbench_r: -DSPEC_LINUX_X64 -DSPEC_LP64
502.gcc_r: -DSPEC_LP64
505.mcf_r: -DSPEC_LP64
520.omnetpp_r: -DSPEC_LP64
523.xalancbmk_r: -DSPEC_LINUX -DSPEC_LP64
525.x264_r: -DSPEC_LP64
531.deepsjeng_r: -DSPEC_LP64
541.leela_r: -DSPEC_LP64
548.exchange2_r: -DSPEC_LP64
557.xz_r: -DSPEC_LP64
```

## Base Optimization Flags

C benchmarks:

```
-m64 -Wl,-allow-multiple-definition -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 -z muldefs
-lamdlibm -ljemalloc -lflang -lflangrti
```

C++ benchmarks:

```
-m64 -std=c++98 -Wl,-mllvm -Wl,-do-block-reorder=aggressive -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
```

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## Base Optimization Flags (Continued)

C++ benchmarks (continued):

```
-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 -mllvm -do-block-reorder=aggressive
-fvirtual-function-elimination -fvisibility=hidden -lamdlibm
-ljemalloc -lflang -lflangrti
```

Fortran benchmarks:

```
-m64 -Wl,-mllvm -Wl,-inline-recursion=4
-Wl,-mllvm -Wl,-lsr-in-nested-loop -Wl,-mllvm -Wl,-enable-iv-split
-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 -z muldefs -mllvm -unroll-aggressive
-mllvm -unroll-threshold=500 -lamdlibm -ljemalloc -lflang -lflangrti
```

## Base Other Flags

C benchmarks:

```
-Wno-unused-command-line-argument
```

C++ benchmarks:

```
-Wno-unused-command-line-argument
```

## Peak Compiler Invocation

C benchmarks:

```
clang
```

C++ benchmarks:

```
clang++
```

Fortran benchmarks:

```
flang
```



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**Software Availability:** Mar-2021

## Peak Portability Flags

```
500.perlbench_r: -DSPEC_LINUX_X64 -DSPEC_LP64
502.gcc_r: -D_FILE_OFFSET_BITS=64
505.mcf_r: -DSPEC_LP64
520.omnetpp_r: -DSPEC_LP64
523.xalancbmk_r: -DSPEC_LINUX -DSPEC_LP64
525.x264_r: -DSPEC_LP64
531.deepsjeng_r: -DSPEC_LP64
541.leela_r: -DSPEC_LP64
548.exchange2_r: -DSPEC_LP64
557.xz_r: -DSPEC_LP64
```

## Peak Optimization Flags

C benchmarks:

```
500.perlbench_r: -m64 -Wl,-allow-multiple-definition
-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
-fprofile-instr-generate(pass 1)
-fprofile-instr-use(pass 2) -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=false
-mllvm -function-specialize -mllvm -enable-licm-vrp
-mllvm -reduce-array-computations=3 -lamdlibm -ljemalloc

502.gcc_r: -m32 -Wl,-allow-multiple-definition
-Wl,-mllvm -Wl,-enable-licm-vrp -flto
-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
-mllvm -reduce-array-computations=3 -fgnu89-inline
-ljemalloc

505.mcf_r: -m64 -Wl,-allow-multiple-definition
-Wl,-mllvm -Wl,-enable-licm-vrp -flto
-Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
```

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## Peak Optimization Flags (Continued)

505.mcf\_r (continued):

```
-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
```

525.x264\_r: basepeak = yes

557.xz\_r: Same as 505.mcf\_r

C++ benchmarks:

520.omnetpp\_r: -m64 -std=c++98

```
-Wl,-mllvm -Wl,-do-block-reorder=aggressive -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
-mllvm -do-block-reorder=aggressive
-fvirtual-function-elimination -fvisibility=hidden
-lamdlibm -ljemalloc
```

523.xalancbmk\_r: -m32 -Wl,-mllvm -Wl,-do-block-reorder=aggressive -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
-mllvm -do-block-reorder=aggressive
-fvirtual-function-elimination -fvisibility=hidden
-ljemalloc
```

531.deepsjeng\_r: Same as 520.omnetpp\_r

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## Peak Optimization Flags (Continued)

541.leela\_r: basepeak = yes

Fortran benchmarks:

548.exchange2\_r: basepeak = yes

## Peak Other Flags

C benchmarks (except as noted below):

-Wno-unused-command-line-argument

502.gcc\_r: -L/usr/lib -Wno-unused-command-line-argument

-L/sppo/bin/cpu2017v115aocc3/amd\_rate\_aocc300\_milan\_A\_lib/32

C++ benchmarks (except as noted below):

-Wno-unused-command-line-argument

523.xalancbmk\_r: -L/usr/lib -Wno-unused-command-line-argument

-L/sppo/bin/cpu2017v115aocc3/amd\_rate\_aocc300\_milan\_A\_lib/32

The flags files that were used to format this result can be browsed at

<http://www.spec.org/cpu2017/flags/aocc300-flags-A1.html>

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

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

<http://www.spec.org/cpu2017/flags/aocc300-flags-A1.xml>

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

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