



# SPEC CPU®2017 Integer Speed Result

Copyright 2017-2021 Standard Performance Evaluation Corporation

## Dell Inc.

SPECspeed®2017\_int\_base = 12.4

PowerEdge R6525 (AMD EPYC 7713 64-Core Processor)

SPECspeed®2017\_int\_peak = 12.4

CPU2017 License: 55

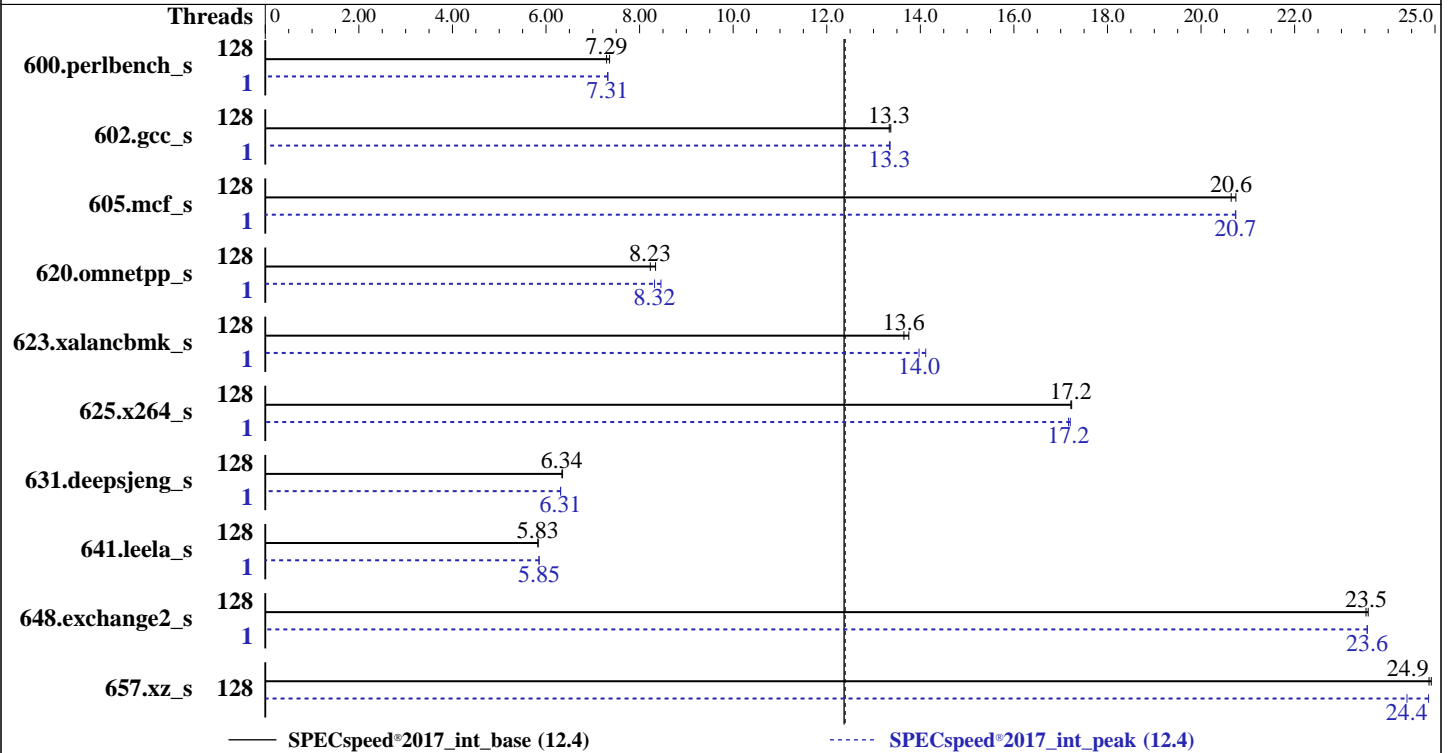
Test Date: Feb-2021

Test Sponsor: Dell Inc.

Hardware Availability: Mar-2021

Tested by: Dell Inc.

Software Availability: Mar-2021



### Hardware

CPU Name: AMD EPYC 7713  
 Max MHz: 3675  
 Nominal: 2000  
 Enabled: 128 cores, 2 chips  
 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 2Rx4 PC4-3200AA-R)  
 Storage: 128 GB on tmpfs  
 Other: None

### Software

OS: Red Hat Enterprise Linux 8.3 (Ootpa)  
 4.18.0-240.el8.x86\_64  
 Compiler: C/C++/Fortran: Version 3.0.0 of AOCC  
 Parallel: Yes  
 Firmware: Version 2.0.3 released Jan-2021  
 File System: tmpfs  
 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						
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
600.perlbench_s	128	<b><u>243</u></b>	<b><u>7.29</u></b>	241	7.36			1	<b><u>243</u></b>	<b><u>7.31</u></b>	242	7.32		
602.gcc_s	128	<b><u>299</u></b>	<b><u>13.3</u></b>	298	13.4			1	298	13.4	<b><u>298</u></b>	<b><u>13.3</u></b>		
605.mcf_s	128	<b><u>229</u></b>	<b><u>20.6</u></b>	228	20.7			1	<b><u>228</u></b>	<b><u>20.7</u></b>	228	20.7		
620.omnetpp_s	128	<b><u>198</u></b>	<b><u>8.23</u></b>	196	8.34			1	193	8.46	<b><u>196</u></b>	<b><u>8.32</u></b>		
623.xalancbmk_s	128	<b><u>104</u></b>	<b><u>13.6</u></b>	103	13.8			1	<b><u>101</u></b>	<b><u>14.0</u></b>	100	14.1		
625.x264_s	128	<b><u>102</u></b>	<b><u>17.2</u></b>	102	17.2			1	103	17.2	<b><u>103</u></b>	<b><u>17.2</u></b>		
631.deepsjeng_s	128	226	6.35	<b><u>226</u></b>	<b><u>6.34</u></b>			1	<b><u>227</u></b>	<b><u>6.31</u></b>	227	6.31		
641.leela_s	128	<b><u>293</u></b>	<b><u>5.83</u></b>	292	5.83			1	<b><u>292</u></b>	<b><u>5.85</u></b>	291	5.85		
648.exchange2_s	128	<b><u>125</u></b>	<b><u>23.5</u></b>	125	23.6			1	<b><u>125</u></b>	<b><u>23.6</u></b>	125	23.6		
657.xz_s	128	<b><u>249</u></b>	<b><u>24.9</u></b>	248	24.9			128	<b><u>253</u></b>	<b><u>24.4</u></b>	249	24.9		

SPECspeed®2017\_int\_base = **12.4**

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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  
'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 randomization (ASLR) to reduce run-to-run variability.

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## Operating System Notes (Continued)

'echo always > /sys/kernel/mm/transparent\_hugepage/enabled' and  
'echo always > /sys/kernel/mm/transparent\_hugepage/defrag' run as root to enable  
Transparent Hugepages (THP) for this run.  
'echo madvise > /sys/kernel/mm/transparent\_hugepage/enabled' run as root for peak  
runs of 628.pop2\_s and 638.imagick\_s to enable THP only on request.

## Environment Variables Notes

Environment variables set by runcpu before the start of the run:

GOMP\_CPU\_AFFINITY = "0-127"

LD\_LIBRARY\_PATH =

"/mnt/ramdisk/cpu2017-1.1.5/amd\_speed\_aocc300\_milan\_B\_lib/64:/mnt/ramdisk/  
k/cpu2017-1.1.5/amd\_speed\_aocc300\_milan\_B\_lib/32:"

MALLOC\_CONF = "retain:true"

OMP\_DYNAMIC = "false"

OMP\_SCHEDULE = "static"

OMP\_STACKSIZE = "128M"

OMP\_THREAD\_LIMIT = "128"

Environment variables set by runcpu during the 600.perlbench\_s peak run:

GOMP\_CPU\_AFFINITY = "0"

Environment variables set by runcpu during the 602.gcc\_s peak run:

GOMP\_CPU\_AFFINITY = "0"

Environment variables set by runcpu during the 605.mcf\_s peak run:

GOMP\_CPU\_AFFINITY = "0"

Environment variables set by runcpu during the 620.omnetpp\_s peak run:

GOMP\_CPU\_AFFINITY = "0"

Environment variables set by runcpu during the 623.xalanbmk\_s peak run:

GOMP\_CPU\_AFFINITY = "0"

Environment variables set by runcpu during the 625.x264\_s peak run:

GOMP\_CPU\_AFFINITY = "0"

Environment variables set by runcpu during the 631.deepsjeng\_s peak run:

GOMP\_CPU\_AFFINITY = "0"

Environment variables set by runcpu during the 641.leela\_s peak run:

GOMP\_CPU\_AFFINITY = "0"

Environment variables set by runcpu during the 648.exchange2\_s peak run:

GOMP\_CPU\_AFFINITY = "0"

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## Environment Variables Notes (Continued)

Environment variables set by runcpu during the 657.xz\_s peak run:  
GOMP\_CPU\_AFFINITY = "0-127"

## 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:

Logical processor : Disabled  
L3 Cache as NUMA Domain : Enabled  
Virtualization Technology : Disabled  
DRAM Refresh Delay : Performance  
System Profile : Custom  
CPU Power Management : Maximum Performance  
Memory Patrol Scrub : Disabled  
PCI ASPM L1 Link  
Power Management : Disabled

Sysinfo program /mnt/ramdisk/cpu2017-1.1.5/bin/sysinfo  
Rev: r6538 of 2020-09-24 e8664e66d2d7080afeaa89d4b38e2f1c  
running on rhel-8-3-amd Fri Feb 26 09:46:30 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 7713 64-Core Processor  
2 "physical id"s (chips)  
128 "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 : 64

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## Platform Notes (Continued)

```

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
CPU(s):                 128
On-line CPU(s) list:   0-127
Thread(s) per core:    1
Core(s) per socket:    64
Socket(s):              2
NUMA node(s):          16
Vendor ID:              AuthenticAMD
CPU family:             25
Model:                  1
Model name:             AMD EPYC 7713 64-Core Processor
Stepping:               1
CPU MHz:                1795.858
BogoMIPS:               3992.04
Virtualization:         AMD-V
L1d cache:              32K
L1i cache:              32K
L2 cache:               512K
L3 cache:               32768K
NUMA node0 CPU(s):     0-7
NUMA node1 CPU(s):     8-15
NUMA node2 CPU(s):     16-23
NUMA node3 CPU(s):     24-31
NUMA node4 CPU(s):     32-39
NUMA node5 CPU(s):     40-47
NUMA node6 CPU(s):     48-55
NUMA node7 CPU(s):     56-63
NUMA node8 CPU(s):     64-71
NUMA node9 CPU(s):     72-79
NUMA node10 CPU(s):    80-87
NUMA node11 CPU(s):    88-95
NUMA node12 CPU(s):    96-103
NUMA node13 CPU(s):    104-111
NUMA node14 CPU(s):    112-119
NUMA node15 CPU(s):    120-127
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

```

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## Platform Notes (Continued)

```

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 sme ssbd mba sev 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 amd_ppin 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
node 0 size: 64074 MB
node 0 free: 63951 MB
node 1 cpus: 8 9 10 11 12 13 14 15
node 1 size: 64507 MB
node 1 free: 64320 MB
node 2 cpus: 16 17 18 19 20 21 22 23
node 2 size: 64509 MB
node 2 free: 64413 MB
node 3 cpus: 24 25 26 27 28 29 30 31
node 3 size: 64509 MB
node 3 free: 64351 MB
node 4 cpus: 32 33 34 35 36 37 38 39
node 4 size: 64503 MB
node 4 free: 64341 MB
node 5 cpus: 40 41 42 43 44 45 46 47
node 5 size: 64509 MB
node 5 free: 64189 MB
node 6 cpus: 48 49 50 51 52 53 54 55
node 6 size: 64505 MB
node 6 free: 59214 MB
node 7 cpus: 56 57 58 59 60 61 62 63
node 7 size: 64491 MB
node 7 free: 64404 MB
node 8 cpus: 64 65 66 67 68 69 70 71
node 8 size: 64503 MB
node 8 free: 64446 MB
node 9 cpus: 72 73 74 75 76 77 78 79
node 9 size: 64507 MB
node 9 free: 64449 MB

```

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## Platform Notes (Continued)

```

node 10 cpus: 80 81 82 83 84 85 86 87
node 10 size: 64472 MB
node 10 free: 64412 MB
node 11 cpus: 88 89 90 91 92 93 94 95
node 11 size: 64509 MB
node 11 free: 64450 MB
node 12 cpus: 96 97 98 99 100 101 102 103
node 12 size: 64509 MB
node 12 free: 64451 MB
node 13 cpus: 104 105 106 107 108 109 110 111
node 13 size: 64507 MB
node 13 free: 64450 MB
node 14 cpus: 112 113 114 115 116 117 118 119
node 14 size: 64505 MB
node 14 free: 64450 MB
node 15 cpus: 120 121 122 123 124 125 126 127
node 15 size: 64503 MB
node 15 free: 64442 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:      1056423412 kB
HugePages_Total:      0
Hugepagesize:    2048 kB

```

```

/sbin/tuned-adm active
Current active profile: throughput-performance

```

```

From /etc/*release* /etc/*version*
os-release:

```

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## Platform Notes (Continued)

```

NAME="Red Hat Enterprise Linux"
VERSION="8.3 (Ootpa)"
ID="rhel"
ID_LIKE="fedora"
VERSION_ID="8.3"
PLATFORM_ID="platform:el8"
PRETTY_NAME="Red Hat Enterprise Linux 8.3 (Ootpa)"
ANSI_COLOR="0;31"

```

```

redhat-release: Red Hat Enterprise Linux release 8.3 (Ootpa)
system-release: Red Hat Enterprise Linux release 8.3 (Ootpa)
system-release-cpe: cpe:/o:redhat:enterprise_linux:8.3:ga

```

uname -a:

```

Linux rhel-8-3-amd 4.18.0-240.el8.x86_64 #1 SMP Wed Sep 23 05:13:10 EDT 2020 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: disabled, RSB filling
CVE-2020-0543 (Special Register Buffer Data Sampling):	Not affected
CVE-2019-11135 (TSX Asynchronous Abort):	Not affected

run-level 3 Nov 25 11:39

SPEC is set to: /mnt/ramdisk/cpu2017-1.1.5

Filesystem	Type	Size	Used	Avail	Use%	Mounted on
tmpfs	tmpfs	128G	5.0G	124G	4%	/mnt/ramdisk

From /sys/devices/virtual/dmi/id

```

Vendor: Dell Inc.
Product: PowerEdge R6525
Product Family: PowerEdge
Serial: C3JVPX2

```

Additional information from dmidecode follows. WARNING: Use caution when you interpret

(Continued on next page)





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## Platform Notes (Continued)

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 802C8632802C 36ASF8G72PZ-3G2E1 64 GB 2 rank 3200

16x Not Specified Not Specified

BIOS:

BIOS Vendor: Dell Inc.

BIOS Version: 2.0.3

BIOS Date: 01/15/2021

BIOS Revision: 2.0

(End of data from sysinfo program)

## Compiler Version Notes

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

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

AMD clang version 12.0.0 (CLANG: AOCC\_3.0.0-Build#78 2020\_12\_10) (based on LLVM Mirror.Version.12.0.0)

Target: x86\_64-unknown-linux-gnu

Thread model: posix

InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin

```
=====  
Fortran | 648.exchange2_s(base, peak)  
-----
```

AMD clang version 12.0.0 (CLANG: AOCC\_3.0.0-Build#78 2020\_12\_10) (based on LLVM Mirror.Version.12.0.0)

Target: x86\_64-unknown-linux-gnu

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## Compiler Version Notes (Continued)

InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin

## Base Compiler Invocation

C benchmarks:

clang

C++ benchmarks:

clang++

Fortran benchmarks:

flang

## Base Portability Flags

```

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

```

## Base Optimization Flags

C benchmarks:

```

-m64 -mno-adx -mno-sse4a -Wl,-allow-multiple-definition
-Wl,-mllvm -Wl,-enable-licm-vrp -Wl,-mllvm -Wl,-region-vectorize
-Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -O3 -march=znver3
-fveclib=AMDLIBM -ffast-math -fltto -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
-DSPEC_OPENMP -fopenmp -fopenmp=libomp -lomp -lamdlibm -ljemalloc

```

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# SPEC CPU®2017 Integer Speed Result

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Dell Inc.

SPECspeed®2017\_int\_base = 12.4

PowerEdge R6525 (AMD EPYC 7713 64-Core Processor)

SPECspeed®2017\_int\_peak = 12.4

CPU2017 License: 55

Test Sponsor: Dell Inc.

Tested by: Dell Inc.

Test Date: Feb-2021

Hardware Availability: Mar-2021

Software Availability: Mar-2021

## Base Optimization Flags (Continued)

C benchmarks (continued):

-lflang -lflangrti

C++ benchmarks:

```

-m64 -std=c++98 -mno-adx -mno-sse4a
-Wl,-mllvm -Wl,-do-block-reorder=aggressive
-Wl,-mllvm -Wl,-region-vectorize -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -O3 -march=znver3
-fveclib=AMDLIBM -ffast-math -flto -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 -DSPEC_OPENMP
-fopenmp -fopenmp=libomp -lomp -lamdlibm -ljemalloc -lflang
-lflangrti

```

Fortran benchmarks:

```

-m64 -mno-adx -mno-sse4a -Wl,-mllvm -Wl,-inline-recursion=4
-Wl,-mllvm -Wl,-lsr-in-nested-loop -Wl,-mllvm -Wl,-enable-iv-split
-Wl,-mllvm -Wl,-region-vectorize -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -O3 -march=znver3
-fveclib=AMDLIBM -ffast-math -flto -z muldefs
-mllvm -unroll-aggressive -mllvm -unroll-threshold=150 -DSPEC_OPENMP
-fopenmp -fopenmp=libomp -lomp -lamdlibm -ljemalloc -lflang
-lflangrti

```

## Base Other Flags

C benchmarks:

-Wno-unused-command-line-argument -Wno-return-type

C++ benchmarks:

-Wno-unused-command-line-argument -Wno-return-type

Fortran benchmarks:

-Wno-return-type



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## Peak Compiler Invocation

C benchmarks:

clang

C++ benchmarks:

clang++

Fortran benchmarks:

flang

## Peak Portability Flags

Same as Base Portability Flags

## Peak Optimization Flags

C benchmarks:

```

-m64 -mno-adx -mno-sse4a -Wl,-allow-multiple-definition
-Wl,-mllvm -Wl,-enable-licm-vrp -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast -march=znver3
-fveclib=AMDLIBM -ffast-math -flto -fstruct-layout=5
-mllvm -unroll-threshold=50 -fremap-arrays -flv-function-specialization
-mllvm -inline-threshold=1000 -mllvm -enable-gvn-hoist
-mllvm -global-vectorize-slp=true -mllvm -function-specialize
-mllvm -enable-licm-vrp -mllvm -reduce-array-computations=3
-DSPEC_OPENMP -fopenmp -fopenmp=libomp -lomp -lamdlibm -ljemalloc
-lflang

```

C++ benchmarks:

```

-m64 -std=c++98 -mno-adx -mno-sse4a
-Wl,-mllvm -Wl,-do-block-reorder=aggressive
-Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast -march=znver3
-fveclib=AMDLIBM -ffast-math -flto -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 -DSPEC_OPENMP
-fopenmp -fopenmp=libomp -lomp -lamdlibm -ljemalloc -lflang

```

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## Peak Optimization Flags (Continued)

Fortran benchmarks:

```
-m64 -mno-adx -mno-sse4a -Wl,-mllvm -Wl,-inline-recursion=4
-Wl,-mllvm -Wl,-lsr-in-nested-loop -Wl,-mllvm -Wl,-enable-iv-split
-Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -O3 -march=znver3
-fveclib=AMDLIBM -ffast-math -flto -mllvm -unroll-aggressive
-mllvm -unroll-threshold=150 -DSPEC_OPENMP -fopenmp -fopenmp=libomp
-lomp -lamdlibm -ljemalloc -lflang
```

## Peak Other Flags

C benchmarks:

-Wno-unused-command-line-argument -Wno-return-type

C++ benchmarks:

-Wno-unused-command-line-argument -Wno-return-type

Fortran benchmarks:

-Wno-return-type

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/Dell-Platform-Flags-PowerEdge-AMD-Milan-rev1.0.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/Dell-Platform-Flags-PowerEdge-AMD-Milan-rev1.0.xml>

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