



SPEC CPU®2017 Integer Speed Result

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Lenovo Global Technology ThinkSystem SR665 2.25 GHz, AMD EPYC 7742

SPECspeed®2017_int_base =	8.97
SPECspeed®2017_int_energy_base =	44.2
SPECspeed®2017_int_peak =	9.21
SPECspeed®2017_int_energy_peak =	45.4

CPU2017 License: 9017

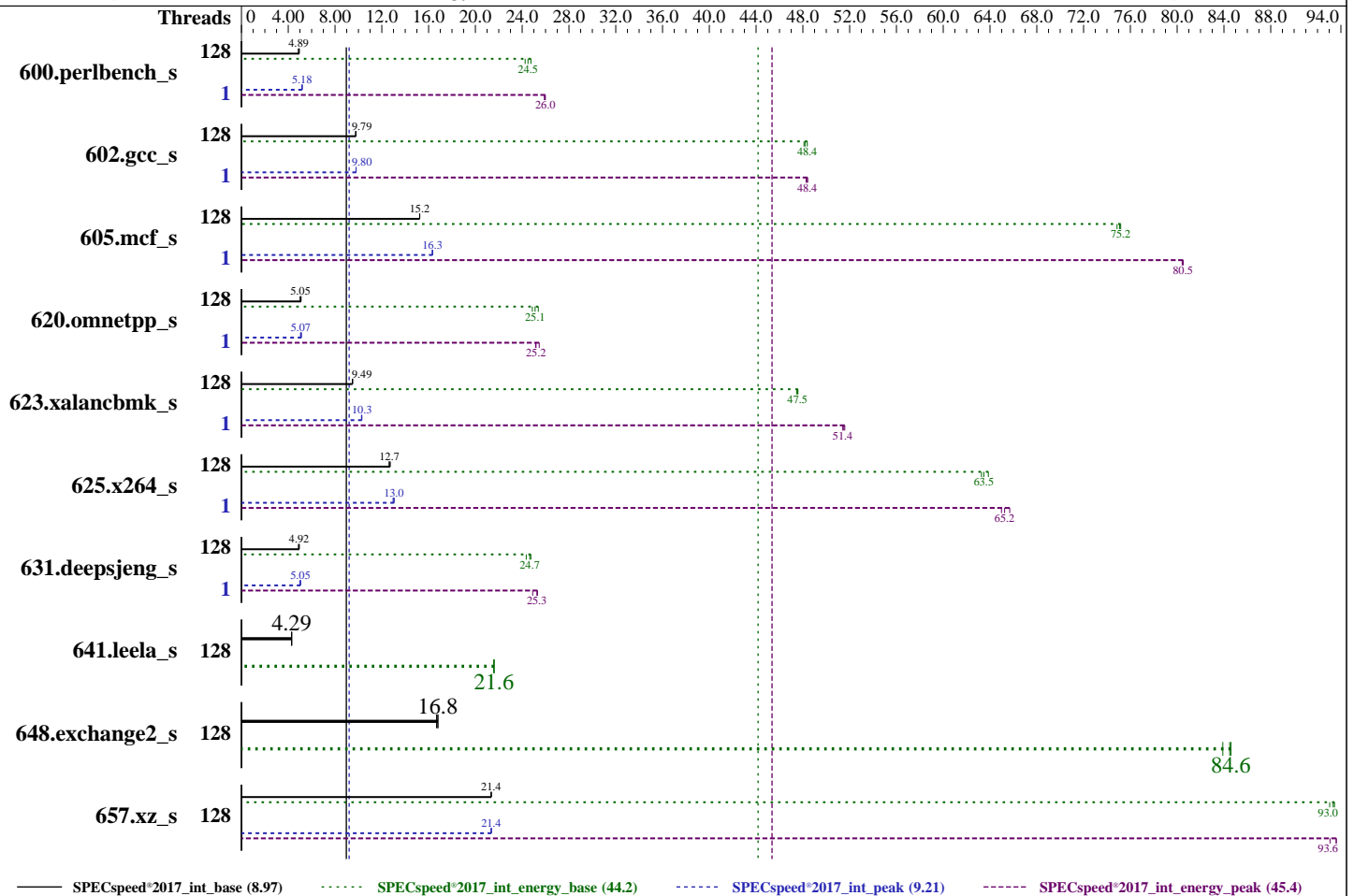
Test Sponsor: Lenovo Global Technology

Tested by: Lenovo Global Technology

Test Date: Apr-2020

Hardware Availability: Jun-2020

Software Availability: Nov-2019



Hardware	Software
CPU Name: AMD EPYC 7742	OS: Red Hat Enterprise Linux 8.1 (Ootpa)
Max MHz: 3400	Kernel 4.18.0-147.el8.x86_64
Nominal: 2250	C/C++/Fortran: Version 2.0.0 of AOCC
Enabled: 128 cores, 2 chips	Compiler: Yes
Orderable: 1,2 chips	Parallel: Yes
Cache L1: 32 KB I + 32 KB D on chip per core	Firmware: Lenovo BIOS Version D8E105F 1.00 released Mar-2020
L2: 512 KB I+D on chip per core	File System: xfs
L3: 256 MB I+D on chip per chip, 16 MB shared / 4 cores	System State: Run level 3 (multi-user)
Other: None	Base Pointers: 64-bit
Memory: 512 GB (16 x 32 GB 2Rx4 PC4-3200AA-R)	Peak Pointers: 32/64-bit
Storage: 1 x 960 GB SATA SSD	Other: jemalloc: jemalloc memory allocator library v5.1.0
Other: None	Power Management: BIOS set to prefer performance at the cost of additional power usage



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Power

Max. Power (W): 646.27
Idle Power (W): 115.4
Min. Temperature (C): 20.50
Elevation (m): 43
Line Standard: 220 V / 50 Hz / 1 phase / 1 wire
Provisioning: Line-powered

Power Settings

Management FW: Version 2.00 of D8BT05U
Memory Mode: Normal

Power-Relevant Hardware

Power Supply: 1 x 1100 W (non-redundant)
Details: ThinkSystem 1100W Platinum Power Supply SP57A14700
Backplane: 8 x 2.5-inch HDD back plane
Other Storage: RAID 930-8i 2GB Flash PCIe 12Gb Adapter
Storage Model #: 6FC81AB0
NICs Installed: 1 x ThinkSystem Ethernet 4-port Adaptor @ 1 Gb
NICs Enabled (FW/OS): 4 / 1
NICs Connected/Speed: 1 @ 1 Gb
Other HW Model #: 6 x High Performance fans

Power Analyzer

Power Analyzer: WIN:8888
Hardware Vendor: YOKOGAWA, Inc.
Model: YokogawaWT310E
Serial Number: C3UG05013E
Input Connection: Default
Metrology Institute: CNAS
Calibration By: China CEPREI Laboratory
Calibration Label: 1GA19013841-0005
Calibration Date: 27-Sep-2019
PTDaemon™ Version: 1.9.1 (a2d19f26; 2019-07-17)
Setup Description: Connected to PSU1
Current Ranges Used: 2.5A
Voltage Range Used: 300V

Temperature Meter

Temperature Meter: WIN:8889
Hardware Vendor: Digi International, Inc.
Model: DigiWATCHPORT_H
Serial Number: COM1
Input Connection: USB
PTDaemon Version: 1.9.1 (a2d19f26; 2019-07-17)
Setup Description: 50 mm in front of SUT main intake

Base Results Table

Benchmark	Threads	Seconds	Ratio	Energy (kJ)	Energy Ratio	Average Power	Maximum Power	Seconds	Ratio	Energy (kJ)	Energy Ratio	Average Power	Maximum Power	Seconds	Ratio	Energy (kJ)	Energy Ratio	Average Power	Maximum Power
600.perlbench_s	128	363	4.89	78.6	24.5	217	222	359	4.95	77.8	24.7	217	221	365	4.87	79.4	24.3	218	225
602.gcc_s	128	407	9.79	89.5	48.4	220	232	408	9.76	90.0	48.1	220	232	407	9.79	89.8	48.2	221	232
605.mcf_s	128	310	15.2	68.6	75.1	221	235	310	15.2	68.5	75.2	221	235	310	15.2	68.8	74.9	222	236
620.omnetpp_s	128	320	5.10	69.9	25.4	219	220	323	5.05	70.7	25.1	219	221	325	5.02	71.4	24.9	219	222
623.xalancbmk_s	128	149	9.49	32.4	47.5	217	218	149	9.50	32.3	47.6	217	218	149	9.49	32.4	47.5	217	218
625.x264_s	128	140	12.6	30.3	63.3	217	218	139	12.7	30.2	63.5	217	218	139	12.7	30.1	63.9	217	218
631.deepsjeng_s	128	294	4.87	64.0	24.4	217	231	291	4.92	63.2	24.7	217	236	290	4.94	63.0	24.7	217	235
641.leela_s	128	397	4.29	85.6	21.6	215	216	398	4.29	85.6	21.6	215	216	398	4.29	85.6	21.6	215	222
648.exchange2_s	128	176	16.7	38.1	83.9	216	217	175	16.8	37.9	84.5	216	218	175	16.8	37.8	84.6	216	217
657.xz_s	128	289	21.4	72.1	93.3	249	640	289	21.4	72.4	93.0	250	641	290	21.3	72.0	93.5	249	640

SPECSpeed®2017_int_base = 8.97

SPECSpeed®2017_int_energy_base = 44.2

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



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Peak Results Table

Benchmark	Threads	Seconds	Ratio	Energy (kJ)	Energy Ratio	Average Power	Maximum Power	Seconds	Ratio	Energy (kJ)	Energy Ratio	Average Power	Maximum Power	Seconds	Ratio	Energy (kJ)	Energy Ratio	Average Power	Maximum Power
600.perlbench_s	1	342	5.18	74.1	26.0	216	219	343	5.18	74.2	25.9	217	220	342	5.19	74.4	25.9	217	222
602.gcc_s	1	406	9.80	89.4	48.4	220	231	406	9.80	89.5	48.4	220	232	407	9.79	89.7	48.3	221	232
605.mcf_s	1	289	16.3	64.0	80.5	221	235	289	16.3	64.0	80.4	221	234	289	16.3	64.0	80.5	221	234
620.omnetpp_s	1	322	5.07	70.5	25.2	219	222	318	5.13	69.7	25.5	219	220	322	5.06	70.6	25.1	219	220
623.xalanbmk_s	1	138	10.3	29.9	51.5	216	217	138	10.3	29.9	51.4	217	218	138	10.3	29.8	51.6	217	217
625.x264_s	1	135	13.0	29.2	65.7	216	218	135	13.0	29.4	65.2	217	218	136	13.0	29.5	65.0	217	218
631.deepsjeng_s	1	284	5.05	61.5	25.3	217	231	287	4.99	62.6	24.9	218	234	284	5.05	61.7	25.3	217	232
641.leela_s	128	397	4.29	85.6	21.6	215	216	398	4.29	85.6	21.6	215	216	398	4.29	85.6	21.6	215	222
648.exchange2_s	128	176	16.7	38.1	83.9	216	217	175	16.8	37.9	84.5	216	218	175	16.8	37.8	84.6	216	217
657.xz_s	128	289	21.4	71.9	93.6	249	640	290	21.4	72.3	93.1	250	646	289	21.4	71.9	93.6	248	639

SPECSpeed®2017_int_peak = 9.21

SPECSpeed®2017_int_energy_peak = 45.4

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>

Set dirty_ratio=8 to limit dirty cache to 8% of memory
Set swappiness=1 to swap only if necessary
Set zone_reclaim_mode=1 to free local node memory and avoid remote memory
sync then drop_caches=3 to reset caches before invoking runcpu

dirty_ratio, swappiness, zone_reclaim_mode and drop_caches were all set using privileged echo (e.g. echo 1 > /proc/sys/vm/swappiness).

Transparent huge pages set to 'always' for this run (OS default)



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Environment Variables Notes

Environment variables set by runcpu before the start of the run:
GOMP_CPU_AFFINITY = "0-127"
LD_LIBRARY_PATH =
 "/home/cpu2017-1.1.0-amd-rome-aocc200-C1/amd_speed_aocc200_rome_C_lib/64
 ;/home/cpu2017-1.1.0-amd-rome-aocc200-C1/amd_speed_aocc200_rome_C_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.xalancbnk_s peak run:
GOMP_CPU_AFFINITY = "0"
OMP_STACKSIZE = "128M"

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 657.xz_s peak run:
GOMP_CPU_AFFINITY = "0-127"

General Notes

Binaries were compiled on a system with 2x AMD EPYC 7601 CPU + 512GB Memory using Fedora 26

NA: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.

(Continued on next page)



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General Notes (Continued)

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.
Yes: The test sponsor attests, as of date of publication, that CVE-2018-3640 (Spectre variant 3a) is mitigated in the system as tested and documented.
Yes: The test sponsor attests, as of date of publication, that CVE-2018-3639 (Spectre variant 4) 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 5.1.0 is available here:
<https://github.com/jemalloc/jemalloc/releases/download/5.1.0/jemalloc-5.1.0.tar.bz2>

Platform Notes

BIOS settings:
Choose Operating Mode set to Maximum Performance and then set it to Custom Mode
SMT Mode set to Disable
NUMA nodes per socket set to NPS4

Sysinfo program /home/cpu2017-1.1.0-amd-rome-aocc200-C1/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edble6e46a485a0011
running on localhost.localdomain Fri Jun 22 19:21:37 2018

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 7742 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
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:

(Continued on next page)



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Platform Notes (Continued)

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): 8
Vendor ID: AuthenticAMD
CPU family: 23
Model: 49
Model name: AMD EPYC 7742 64-Core Processor
Stepping: 0
CPU MHz: 3074.115
CPU max MHz: 2250.0000
CPU min MHz: 1500.0000
BogoMIPS: 4491.64
Virtualization: AMD-V
L1d cache: 32K
L1i cache: 32K
L2 cache: 512K
L3 cache: 16384K
NUMA node0 CPU(s): 0-15
NUMA node1 CPU(s): 16-31
NUMA node2 CPU(s): 32-47
NUMA node3 CPU(s): 48-63
NUMA node4 CPU(s): 64-79
NUMA node5 CPU(s): 80-95
NUMA node6 CPU(s): 96-111
NUMA node7 CPU(s): 112-127

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
constant_tsc rep_good nopl xtopology nonstop_tsc cpuid extd_apicid aperfmperf pni
pclmulqdq monitor ssse3 fma cx16 sse4_1 sse4_2 movbe popcnt aes xsave avx f16c
rdrand lahf_lm cmp_legacy svm extapic cr8_legacy abm sse4a misalignsse 3dnowprefetch
osvw ibs skinit wdt tce topoext perfctr_core perfctr_nb 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

/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: 8 nodes (0-7)
node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
node 0 size: 64311 MB
node 0 free: 64115 MB
node 1 cpus: 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
node 1 size: 64506 MB
node 1 free: 64375 MB
node 2 cpus: 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47
node 2 size: 64506 MB
node 2 free: 64174 MB
node 3 cpus: 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63
node 3 size: 64469 MB
node 3 free: 64378 MB
node 4 cpus: 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79
node 4 size: 64506 MB
node 4 free: 64352 MB
node 5 cpus: 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95
node 5 size: 64506 MB
node 5 free: 64353 MB
node 6 cpus: 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111
node 6 size: 64506 MB
node 6 free: 64398 MB
node 7 cpus: 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127
node 7 size: 64507 MB
node 7 free: 64385 MB
```

```
node distances:
node  0  1  2  3  4  5  6  7
  0:  10 12 12 12 32 32 32 32
  1:  12 10 12 12 32 32 32 32
  2:  12 12 10 12 32 32 32 32
  3:  12 12 12 10 32 32 32 32
  4:  32 32 32 32 10 12 12 12
  5:  32 32 32 32 12 10 12 12
  6:  32 32 32 32 12 12 10 12
  7:  32 32 32 32 12 12 12 10
```

From /proc/meminfo
MemTotal: 528200880 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

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Platform Notes (Continued)

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

os-release:

```
NAME="Red Hat Enterprise Linux"
VERSION="8.1 (Ootpa)"
ID="rhel"
ID_LIKE="fedora"
VERSION_ID="8.1"
PLATFORM_ID="platform:el8"
PRETTY_NAME="Red Hat Enterprise Linux 8.1 (Ootpa)"
ANSI_COLOR="0;31"
```

```
redhat-release: Red Hat Enterprise Linux release 8.1 (Ootpa)
system-release: Red Hat Enterprise Linux release 8.1 (Ootpa)
system-release-cpe: cpe:/o:redhat:enterprise_linux:8.1:ga
```

uname -a:

```
Linux localhost.localdomain 4.18.0-147.el8.x86_64 #1 SMP Thu Sep 26 15:52:44 UTC 2019
x86_64 x86_64 x86_64 GNU/Linux
```

Kernel self-reported vulnerability status:

```
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
```

run-level 3 Jun 22 19:12

```
SPEC is set to: /home/cpu2017-1.1.0-amd-rome-aocc200-C1
Filesystem Type Size Used Avail Use% Mounted on
/dev/sdb2 xfs 838G 30G 808G 4% /home
```

From /sys/devices/virtual/dmi/id

```
BIOS: Lenovo D8E105F-1.00 03/19/2020
Vendor: Lenovo
Product: ThinkSystem SR665 MB
Product Family: ThinkSystem
Serial: 1234567890
```

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 Samsung M393A4K40DB3-CWE 32 kB 2 rank 3200
16x Unknown Unknown

(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)  
-----
```

```
AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins  
  AOCC_2_0_0-Build#191) (based on LLVM AOCC.LLVM.2.0.0.B191.2019_07_19)  
Target: x86_64-unknown-linux-gnu  
Thread model: posix  
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin  
-----
```

```
=====  
C++   | 623.xalancbmk_s(peak)  
-----
```

```
AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins  
  AOCC_2_0_0-Build#191) (based on LLVM AOCC.LLVM.2.0.0.B191.2019_07_19)  
Target: i386-unknown-linux-gnu  
Thread model: posix  
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin  
-----
```

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

```
AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins  
  AOCC_2_0_0-Build#191) (based on LLVM AOCC.LLVM.2.0.0.B191.2019_07_19)  
Target: x86_64-unknown-linux-gnu  
Thread model: posix  
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin  
-----  
=====
```

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Lenovo Global Technology
ThinkSystem SR665
2.25 GHz, AMD EPYC 7742

SPECspeed®2017_int_base = 8.97
SPECspeed®2017_int_energy_base = 44.2
SPECspeed®2017_int_peak = 9.21
SPECspeed®2017_int_energy_peak = 45.4

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology

Test Date: Apr-2020
Hardware Availability: Jun-2020
Software Availability: Nov-2019

Compiler Version Notes (Continued)

C++ | 623.xalancbmk_s(peak)

AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins
AOCC_2_0_0-Build#191) (based on LLVM AOCC.LLVM.2.0.0.B191.2019_07_19)
Target: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin

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

AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins
AOCC_2_0_0-Build#191) (based on LLVM AOCC.LLVM.2.0.0.B191.2019_07_19)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin

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

AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins
AOCC_2_0_0-Build#191) (based on LLVM AOCC.LLVM.2.0.0.B191.2019_07_19)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin

Base Compiler Invocation

C benchmarks:
clang

C++ benchmarks:
clang++

Fortran benchmarks:
flang



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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:

```
-flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-region-vectorize -Wl,-mllvm -Wl,-vector-library=LIBMVEC
-Wl,-mllvm -Wl,-reduce-array-computations=3 -O3 -ffast-math
-march=znver2 -fstruct-layout=3 -mllvm -unroll-threshold=50
-freemap-arrays -mllvm -function-specialize -mllvm -enable-gvn-hoist
-mllvm -reduce-array-computations=3 -mllvm -global-vectorize-slp
-mllvm -vector-library=LIBMVEC -mllvm -inline-threshold=1000
-flv-function-specialization -z muldefs -DSPEC_OPENMP -fopenmp
-DUSE_OPENMP -fopenmp=libomp -lomp -lpthread -ldl -lmvec -lamdlibm
-ljemalloc -lflang
```

C++ benchmarks:

```
-flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-region-vectorize -Wl,-mllvm -Wl,-vector-library=LIBMVEC
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-suppress-fmas -O3 -ffast-math -march=znver2
-mllvm -loop-unswitch-threshold=200000 -mllvm -vector-library=LIBMVEC
-mllvm -unroll-threshold=100 -flv-function-specialization
-mllvm -enable-partial-unswitch -z muldefs -DSPEC_OPENMP -fopenmp
-DUSE_OPENMP -fopenmp=libomp -lomp -lpthread -ldl -lmvec -lamdlibm
-ljemalloc -lflang
```

Fortran benchmarks:

```
-flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-region-vectorize -Wl,-mllvm -Wl,-vector-library=LIBMVEC
-Wl,-mllvm -Wl,-reduce-array-computations=3 -ffast-math
-Wl,-mllvm -Wl,-inline-recursion=4 -Wl,-mllvm -Wl,-lsr-in-nested-loop
-Wl,-mllvm -Wl,-enable-iv-split -O3 -march=znver2 -funroll-loops
```

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Base Optimization Flags (Continued)

Fortran benchmarks (continued):

```
-Mrecursive -mllvm -vector-library=LIBMVEC -z muldefs
-mllvm -disable-indvar-simplify -mllvm -unroll-aggressive
-mllvm -unroll-threshold=150 -DSPEC_OPENMP -fopenmp -DUSE_OPENMP
-fopenmp=libomp -lomp -lpthread -ldl -lmvec -lamdlibm -ljemalloc
-lflang
```

Base Other Flags

C benchmarks:

```
-Wno-return-type
```

C++ benchmarks:

```
-Wno-return-type
```

Fortran benchmarks:

```
-Wno-return-type
```

Peak Compiler Invocation

C benchmarks:

```
clang
```

C++ benchmarks:

```
clang++
```

Fortran benchmarks:

```
flang
```

Peak 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 -D_FILE_OFFSET_BITS=64
```

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Peak Portability Flags (Continued)

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

Peak Optimization Flags

C benchmarks:

```
600.perlbench_s: -flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-region-vectorize
-Wl,-mllvm -Wl,-vector-library=LIBMVEC
-Wl,-mllvm -Wl,-reduce-array-computations=3
-fprofile-instr-generate(pass 1)
-fprofile-instr-use(pass 2) -Ofast -march=znver2
-mno-sse4a -fstruct-layout=5
-mllvm -vectorize-memory-aggressively
-mllvm -function-specialize -mllvm -enable-gvn-hoist
-mllvm -unroll-threshold=50 -fremap-arrays
-mllvm -vector-library=LIBMVEC
-mllvm -reduce-array-computations=3
-mllvm -global-vectorize-slp -mllvm -inline-threshold=1000
-flv-function-specialization -DSPEC_OPENMP -fopenmp
-DUSE_OPENMP -lmvec -lamdlibm -fopenmp=libomp -lomp
-lpthread -ldl -ljemalloc -lflang
```

```
602 gcc_s: -flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-region-vectorize
-Wl,-mllvm -Wl,-vector-library=LIBMVEC
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast
-march=znver2 -mno-sse4a -fstruct-layout=5
-mllvm -vectorize-memory-aggressively
-mllvm -function-specialize -mllvm -enable-gvn-hoist
-mllvm -unroll-threshold=50 -fremap-arrays
-mllvm -vector-library=LIBMVEC
-mllvm -reduce-array-computations=3
-mllvm -global-vectorize-slp -mllvm -inline-threshold=1000
-flv-function-specialization -z muldefs -DSPEC_OPENMP
-fopenmp -DUSE_OPENMP -fgnu89-inline -fopenmp=libomp
-lomp -lpthread -ldl -ljemalloc
```

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Peak Optimization Flags (Continued)

```
605.mcf_s: -flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-region-vectorize
-Wl,-mllvm -Wl,-vector-library=LIBMVEC
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast
-march=znver2 -mno-sse4a -fstruct-layout=5
-mllvm -vectorize-memory-aggressively
-mllvm -function-specialize -mllvm -enable-gvn-hoist
-mllvm -unroll-threshold=50 -fremap-arrays
-mllvm -vector-library=LIBMVEC
-mllvm -reduce-array-computations=3
-mllvm -global-vectorize-slp -mllvm -inline-threshold=1000
-flv-function-specialization -DSPEC_OPENMP -fopenmp
-DUSE_OPENMP -lmvec -lamdlibm -fopenmp=libomp -lomp
-lpthread -ldl -ljemalloc -lflang
```

625.x264_s: Same as 600.perlbench_s

```
657.xz_s: -flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-region-vectorize
-Wl,-mllvm -Wl,-vector-library=LIBMVEC
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast
-march=znver2 -mno-sse4a -fstruct-layout=5
-mllvm -vectorize-memory-aggressively
-mllvm -function-specialize -mllvm -enable-gvn-hoist
-mllvm -unroll-threshold=50 -fremap-arrays
-mllvm -vector-library=LIBMVEC
-mllvm -reduce-array-computations=3
-mllvm -global-vectorize-slp -mllvm -inline-threshold=1000
-flv-function-specialization -DSPEC_OPENMP -fopenmp
-DUSE_OPENMP -fopenmp=libomp -lomp -lpthread -ldl
-lmvec -lamdlibm -ljemalloc -lflang
```

C++ benchmarks:

```
620.omnetpp_s: -flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-region-vectorize
-Wl,-mllvm -Wl,-vector-library=LIBMVEC
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast
-march=znver2 -flv-function-specialization
-mllvm -unroll-threshold=100
-mllvm -enable-partial-unswitch
-mllvm -loop-unswitch-threshold=200000
-mllvm -vector-library=LIBMVEC
-mllvm -inline-threshold=1000 -DSPEC_OPENMP -fopenmp
```

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Peak Optimization Flags (Continued)

620.omnetpp_s (continued):

```
-DUSE_OPENMP -fopenmp=libomp -lomp -lpthread -ldl  
-lmvec -lamdlibm -ljemalloc -lflang
```

623.xalancbmk_s: -m32 -flto -Wl,-mllvm -Wl,-function-specialize

```
-Wl,-mllvm -Wl,-region-vectorize  
-Wl,-mllvm -Wl,-vector-library=LIBMVEC  
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast  
-march=znver2 -flv-function-specialization  
-mllvm -unroll-threshold=100  
-mllvm -enable-partial-unswitch  
-mllvm -loop-unswitch-threshold=200000  
-mllvm -vector-library=LIBMVEC  
-mllvm -inline-threshold=1000 -DSPEC_OPENMP -fopenmp  
-DUSE_OPENMP -fopenmp=libomp -lomp -lpthread -ldl  
-ljemalloc
```

631.deepsjeng_s: Same as 620.omnetpp_s

641.leela_s: basepeak = yes

Fortran benchmarks:

648.exchange2_s: basepeak = yes

Peak Other Flags

C benchmarks:

```
-Wno-return-type
```

C++ benchmarks (except as noted below):

```
-Wno-return-type
```

623.xalancbmk_s: -Wno-return-type

```
-L/spo/dev/cpu2017/v110/amd_speed_aocc200_rome_C_lib/32
```

Fortran benchmarks:

```
-Wno-return-type
```




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

<http://www.spec.org/cpu2017/flags/aocc200-flags-B1-1.html>
<http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-Rome2P-J.html>

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

<http://www.spec.org/cpu2017/flags/aocc200-flags-B1-1.xml>
<http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-Rome2P-J.xml>

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