



SPEC CPU®2017 Integer Speed Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

Lenovo Global Technology ThinkSystem SR655 2.00 GHz, AMD EPYC 7702P

SPECspeed®2017_int_base = 8.84
 SPECspeed®2017_int_energy_base = 72.1
 SPECspeed®2017_int_peak = 9.07
 SPECspeed®2017_int_energy_peak = 73.8

CPU2017 License: 9017

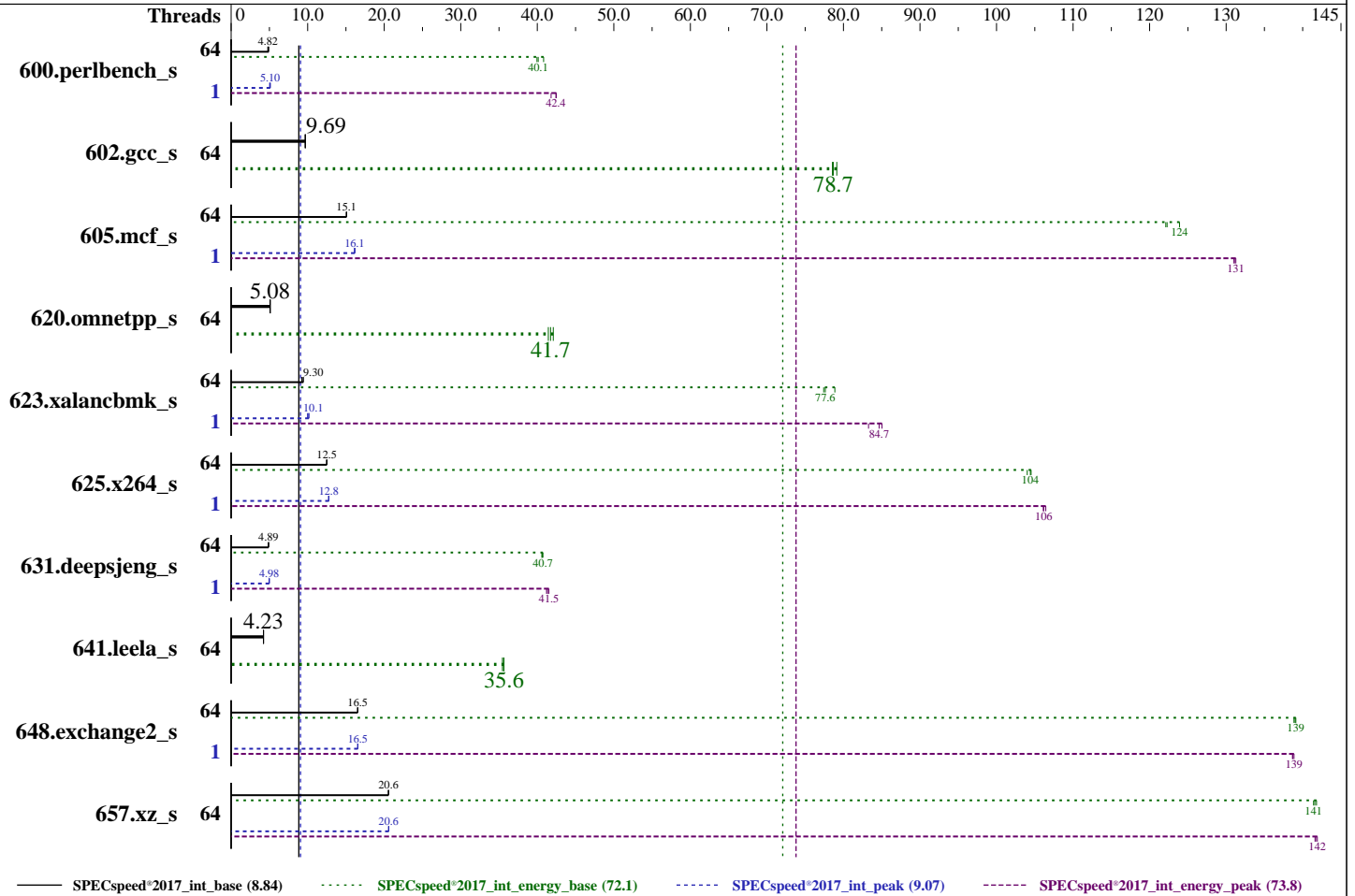
Test Sponsor: Lenovo Global Technology

Tested by: Lenovo Global Technology

Test Date: Sep-2019

Hardware Availability: Aug-2019

Software Availability: Aug-2019



| Hardware | Software |
|--|---|
| CPU Name: AMD EPYC 7702P | OS: Red Hat Enterprise Linux release 8.0 (Ootpa) |
| Max MHz: 3350 | Kernel 4.18.0-80.el8.x86_64 |
| Nominal: 2000 | C/C++/Fortran: Version 2.0.0 of AOCC |
| Enabled: 64 cores, 1 chip | Parallel: Yes |
| Orderable: 1 chip | Firmware: Lenovo BIOS Version CFE103L released Aug-2019 |
| Cache L1: 32 KB I + 32 KB D on chip per core | File System: xfs |
| L2: 512 KB I+D on chip per core | System State: Run level 3 (multi-user) |
| L3: 256 MB I+D on chip per chip, 16 MB shared / 4 cores | Base Pointers: 64-bit |
| Other: None | Peak Pointers: 32/64-bit |
| Memory: 256 GB (8 x 32 GB 2Rx4 PC4-3200AA-R) | Other: jemalloc: jemalloc memory allocator library v5.1.0 |
| Storage: 1 x 960 GB SATA SSD | Power Management: Disabled |
| Other: None | |



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Power

Max. Power (W): 287.37
Idle Power (W): 97.62
Min. Temperature (C): 21.56
Elevation (m): 43
Line Standard: 220 V / 50 Hz / 1 phase / 1 wire
Provisioning: Line-powered

Power Settings

Management FW: Version 1.25 of AMBT03I
Memory Mode: Normal

Power-Relevant Hardware

Power Supply: 1 x 750 W (non-redundant)
Details: Lenovo 750W Platinum Hot-SWap Power Supply
Backplane: hot-swap drive bays
Other Storage: None
Storage Model #: MTFDDAK960TTDN
NICs Installed: 1 x 4-port OCP Ethernet Adapter @ 1 Gb
NICs Enabled (FW/OS): 4 / 1
NICs Connected/Speed: 1 @ 1 Gb
Other HW Model #: None

Power Analyzer

Power Analyzer: WIN:8888
Hardware Vendor: YOKOGAWA, Inc.
Model: YokogawaWT310
Serial Number: C2RA21002V
Input Connection: Default
Metrology Institute: CNAS
Calibration By: China CEPREI Laboratory
Calibration Label: 1GA18013618-0009
Calibration Date: 29-Oct-2018
PTDaemon™ Version: 1.9.1 (a2d19f26; 2019-07-17)
Setup Description: Connected to PSU1
Current Ranges Used: 2A
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 | 64 | 370 | 4.80 | 48.2 | 40.0 | 130 | 134 | 361 | 4.92 | 47.2 | 40.8 | 131 | 134 | 369 | 4.82 | 48.0 | 40.1 | 130 | 134 |
| 602.gcc_s | 64 | 411 | 9.70 | 54.7 | 79.1 | 133 | 145 | 412 | 9.68 | 55.1 | 78.6 | 134 | 145 | 411 | 9.69 | 55.0 | 78.7 | 134 | 146 |
| 605.mcf_s | 64 | 314 | 15.0 | 42.1 | 122 | 134 | 148 | 313 | 15.1 | 41.6 | 124 | 133 | 138 | 313 | 15.1 | 42.2 | 122 | 135 | 148 |
| 620.omnetpp_s | 64 | 321 | 5.08 | 42.5 | 41.7 | 132 | 134 | 318 | 5.12 | 42.2 | 42.1 | 132 | 134 | 321 | 5.08 | 42.8 | 41.4 | 133 | 134 |
| 623.xalancbmk_s | 64 | 153 | 9.25 | 19.9 | 77.4 | 130 | 131 | 150 | 9.45 | 19.5 | 78.9 | 130 | 132 | 152 | 9.30 | 19.8 | 77.6 | 130 | 132 |
| 625.x264_s | 64 | 141 | 12.5 | 18.4 | 105 | 130 | 132 | 141 | 12.5 | 18.4 | 104 | 130 | 132 | 141 | 12.5 | 18.5 | 104 | 130 | 132 |
| 631.deepsjeng_s | 64 | 293 | 4.89 | 38.2 | 40.7 | 130 | 141 | 294 | 4.87 | 38.3 | 40.6 | 130 | 143 | 293 | 4.89 | 38.4 | 40.6 | 131 | 146 |
| 641.leela_s | 64 | 404 | 4.23 | 51.9 | 35.6 | 129 | 129 | 404 | 4.23 | 51.8 | 35.6 | 128 | 130 | 403 | 4.23 | 52.1 | 35.4 | 129 | 130 |
| 648.exchange2_s | 64 | 178 | 16.5 | 23.0 | 139 | 129 | 131 | 178 | 16.5 | 23.0 | 139 | 129 | 130 | 178 | 16.6 | 23.0 | 139 | 130 | 130 |
| 657.xz_s | 64 | 301 | 20.6 | 47.5 | 142 | 158 | 287 | 301 | 20.6 | 47.5 | 142 | 158 | 287 | 301 | 20.6 | 47.6 | 141 | 158 | 287 |

SPECspeed®2017_int_base = 8.84

SPECspeed®2017_int_energy_base = 72.1

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



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CPU2017 License: 9017
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Test Date: Sep-2019
Hardware Availability: Aug-2019
Software Availability: Aug-2019

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 | 347 | 5.11 | 45.3 | 42.5 | 131 | 135 | 353 | 5.03 | 46.1 | 41.8 | 131 | 135 | 348 | 5.10 | 45.4 | 42.4 | 130 | 135 |
| 602.gcc_s | 64 | 411 | 9.70 | 54.7 | 79.1 | 133 | 145 | 412 | 9.68 | 55.1 | 78.6 | 134 | 145 | 411 | 9.69 | 55.0 | 78.7 | 134 | 146 |
| 605.mcf_s | 1 | 292 | 16.1 | 39.3 | 131 | 134 | 148 | 293 | 16.1 | 39.3 | 131 | 134 | 148 | 293 | 16.1 | 39.2 | 131 | 134 | 148 |
| 620.omnetpp_s | 64 | 321 | 5.08 | 42.5 | 41.7 | 132 | 134 | 318 | 5.12 | 42.2 | 42.1 | 132 | 134 | 321 | 5.08 | 42.8 | 41.4 | 133 | 134 |
| 623.xalanbmk_s | 1 | 140 | 10.1 | 18.2 | 84.7 | 130 | 131 | 142 | 9.98 | 18.5 | 83.3 | 130 | 131 | 139 | 10.2 | 18.1 | 85.0 | 130 | 131 |
| 625.x264_s | 1 | 138 | 12.8 | 18.0 | 106 | 131 | 132 | 139 | 12.7 | 18.1 | 106 | 131 | 133 | 138 | 12.8 | 18.1 | 106 | 131 | 132 |
| 631.deepsjeng_s | 1 | 289 | 4.96 | 37.8 | 41.2 | 131 | 144 | 287 | 4.98 | 37.7 | 41.3 | 131 | 149 | 288 | 4.98 | 37.5 | 41.5 | 130 | 144 |
| 641.leela_s | 64 | 404 | 4.23 | 51.9 | 35.6 | 129 | 129 | 404 | 4.23 | 51.8 | 35.6 | 128 | 130 | 403 | 4.23 | 52.1 | 35.4 | 129 | 130 |
| 648.exchange2_s | 1 | 178 | 16.5 | 23.0 | 139 | 130 | 131 | 178 | 16.6 | 23.1 | 139 | 130 | 131 | 178 | 16.5 | 23.1 | 139 | 130 | 132 |
| 657.xz_s | 64 | 300 | 20.6 | 47.5 | 142 | 158 | 287 | 300 | 20.6 | 47.4 | 142 | 158 | 287 | 300 | 20.6 | 47.5 | 142 | 158 | 287 |

SPECSpeed®2017_int_peak = 9.07

SPECSpeed®2017_int_energy_peak = 73.8

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 = "0-63"
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 = "64"

Environment variables set by runcpu during the 600.perlbench_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 623.xalancbmk_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 648.exchange2_s peak run:
GOMP_CPU_AFFINITY = "0"

Environment variables set by runcpu during the 657.xz_s peak run:
GOMP_CPU_AFFINITY = "0-63"

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.

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)

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General Notes (Continued)

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:
cTDP Control set to Manual
cTDP set to 200
Memory Speed set to Auto
SMT Mode set to Disabled
EfficiencyModeEn set to Auto
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 Tue Sep 24 21:05:47 2019

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 7702P 64-Core Processor
1 "physical id"s (chips)
64 "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

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian

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Platform Notes (Continued)

```

CPU(s): 64
On-line CPU(s) list: 0-63
Thread(s) per core: 1
Core(s) per socket: 64
Socket(s): 1
NUMA node(s): 4
Vendor ID: AuthenticAMD
CPU family: 23
Model: 49
Model name: AMD EPYC 7702P 64-Core Processor
Stepping: 0
CPU MHz: 1860.688
CPU max MHz: 2000.0000
CPU min MHz: 1500.0000
BogoMIPS: 3992.57
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
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 fl6c
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 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
cache size : 512 KB
```

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a physical chip.

```
available: 4 nodes (0-3)
node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
node 0 size: 64306 MB
```

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Platform Notes (Continued)

```
node 0 free: 64022 MB
node 1 cpus: 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
node 1 size: 64497 MB
node 1 free: 64258 MB
node 2 cpus: 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47
node 2 size: 64497 MB
node 2 free: 64123 MB
node 3 cpus: 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63
node 3 size: 64460 MB
node 3 free: 64205 MB
node distances:
node  0  1  2  3
  0:  10  12  12  12
  1:  12  10  12  12
  2:  12  12  10  12
  3:  12  12  12  10
```

```
From /proc/meminfo
MemTotal:      263948396 kB
HugePages_Total:      0
Hugepagesize:    2048 kB
```

```
From /etc/*release* /etc/*version*
os-release:
  NAME="Red Hat Enterprise Linux"
  VERSION="8.0 (Ootpa)"
  ID="rhel"
  ID_LIKE="fedora"
  VERSION_ID="8.0"
  PLATFORM_ID="platform:el8"
  PRETTY_NAME="Red Hat Enterprise Linux 8.0 (Ootpa)"
  ANSI_COLOR="0;31"
redhat-release: Red Hat Enterprise Linux release 8.0 (Ootpa)
system-release: Red Hat Enterprise Linux release 8.0 (Ootpa)
system-release-cpe: cpe:/o:redhat:enterprise_linux:8.0:ga
```

```
uname -a:
Linux localhost.localdomain 4.18.0-80.el8.x86_64 #1 SMP Wed Mar 13 12:02:46 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:      No status reported
CVE-2017-5754 (Meltdown):              Not affected
```

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Platform Notes (Continued)

CVE-2018-3639 (Speculative Store Bypass): Mitigation: Speculative Store Bypass disabled via prctl and seccomp
CVE-2017-5753 (Spectre variant 1): Mitigation: __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Full AMD retpoline, IBPB: conditional, IBRS_FW, STIBP: disabled, RSB filling

run-level 3 Sep 24 20:52

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 34G 804G 4% /home

From /sys/devices/virtual/dmi/id
BIOS: Lenovo CFE103L 08/19/2019
Vendor: Lenovo
Product: ThinkSystem SR655 -[7Y00000000]-
Product Family: ThinkSystem
Serial: 0123456789

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:
8x Samsung M393A4K40DB2-CWE 32 kB 2 rank 3200
8x 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

=====

(Continued on next page)



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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

=====
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

(Continued on next page)



SPEC CPU®2017 Integer Speed Result

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Lenovo Global Technology
ThinkSystem SR655
2.00 GHz, AMD EPYC 7702P

SPECspeed®2017_int_base = 8.84
SPECspeed®2017_int_energy_base = 72.1
SPECspeed®2017_int_peak = 9.07
SPECspeed®2017_int_energy_peak = 73.8

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

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

Compiler Version Notes (Continued)

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

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
-fremap-arrays -mllvm -function-specialize -mllvm -enable-gvn-hoist
-mllvm -reduce-array-computations=3 -mllvm -global-vectorize-slp

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Base Optimization Flags (Continued)

C benchmarks (continued):

```
-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
-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
```



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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
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
```

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Peak Optimization Flags (Continued)

600.perlbench_s (continued):

```
-flv-function-specialization -DSPEC_OPENMP -fopenmp
-DUSE_OPENMP -lmvec -lamdlibm -fopenmp=libomp -lomp
-lpthread -ldl -ljemalloc -lflang
```

602.gcc_s: basepeak = yes

```
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: basepeak = yes

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Peak Optimization Flags (Continued)

```
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: -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
-lmvec -lamdlibm -ljemalloc -lflang
```

641.leela_s: basepeak = yes

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
-Mrecursive -mllvm -vector-library=LIBMVEC
-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
```



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Peak Other Flags

C benchmarks:

-Wno-return-type

C++ benchmarks (except as noted below):

-Wno-return-type

623.xalancbmk_s: -Wno-return-type

-L/sppo/dev/cpu2017/v110/amd_speed_aocc200_rome_C_lib/32

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/aocc200-flags-B1-1.html>

<http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-Rome-D.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-Rome-D.xml>

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