SPEC® CINT2006 Result

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ASUSTeK Computer Inc.

(Test Sponsor: Advanced Micro Devices)

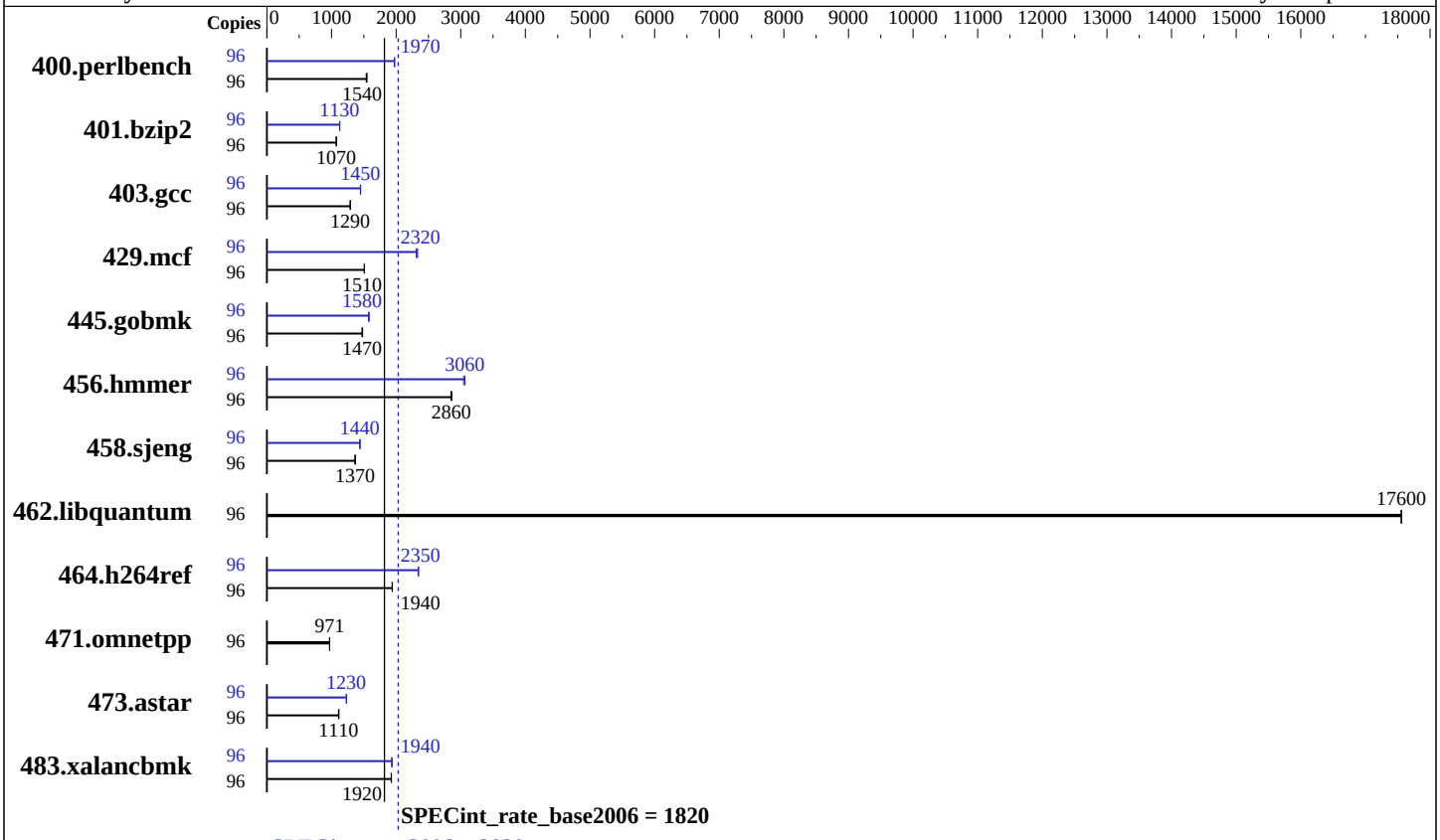
Asus RS700A-E9,
AMD EPYC 7451

SPECint®_rate2006 = 2030

SPECint_rate_base2006 = 1820

CPU2006 license: 49
Test sponsor: Advanced Micro Devices
Tested by: Advanced Micro Devices

Test date: Jul-2017
Hardware Availability: Sep-2017
Software Availability: Apr-2016



Hardware

CPU Name:	AMD EPYC 7451
CPU Characteristics:	AMD Turbo CORE technology up to 3.20 GHz
CPU MHz:	2300
FPU:	Integrated
CPU(s) enabled:	48 cores, 2 chips, 24 cores/chip, 2 threads/core
CPU(s) orderable:	1,2 chips
Primary Cache:	64 KB I + 32 KB D on chip per core
Secondary Cache:	512 KB I+D on chip per core
L3 Cache:	64 MB I+D on chip per chip, 8 MB shared / 3 cores
Other Cache:	None
Memory:	512 GB (16 x 32 GB 2Rx4 PC4-2667V-R, running at 2400)
Disk Subsystem:	1 x 1 TB SSD
Other Hardware:	None

Software

Operating System:	Ubuntu 16.04.2 LTS, Kernel 4.4.0-87-generic
Compiler:	C/C++: Version 4.5.2.1 of x86 Open64 Compiler Suite (from AMD)
Auto Parallel:	No
File System:	ext4
System State:	Run level 3 (Full multiuser with network)
Base Pointers:	32/64-bit
Peak Pointers:	32/64-bit
Other Software:	MicroQuill SmartHeap 10.0 32-bit Library for Linux

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Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
400.perlbench	96	605	1550	**609**	**1540**	610	1540	96	475	1970	**475**	**1970**	474	1980
401.bzip2	96	858	1080	**862**	**1070**	865	1070	96	**822**	**1130**	824	1120	822	1130
403.gcc	96	600	1290	**598**	**1290**	598	1290	96	534	1450	**533**	**1450**	533	1450
429.mcf	96	**580**	**1510**	581	1510	580	1510	96	375	2330	379	2310	**377**	**2320**
445.gobmk	96	680	1480	**683**	**1470**	683	1470	96	641	1570	636	1580	**639**	**1580**
456.hmmer	96	315	2850	313	2860	**314**	**2860**	96	**292**	**3060**	292	3070	294	3040
458.sjeng	96	**849**	**1370**	853	1360	847	1370	96	806	1440	808	1440	**807**	**1440**
462.libquantum	96	**113**	**17600**	113	17600	113	17600	96	**113**	**17600**	113	17600	113	17600
464.h264ref	96	**1095**	**1940**	1096	1940	1094	1940	96	908	2340	905	2350	**906**	**2350**
471.omnetpp	96	619	969	**618**	**971**	618	972	96	619	969	**618**	**971**	618	972
473.astar	96	**606**	**1110**	608	1110	605	1110	96	**548**	**1230**	547	1230	548	1230
483.xalancbmk	96	344	1930	344	1920	**344**	**1920**	96	342	1940	**342**	**1940**	343	1930

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

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

runspec command invoked through numactl i.e.:
numactl --interleave=all runspec <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

Transparent huge pages were enabled for this run (OS default)

Set vm/nr_hugepages=86016 in /etc/sysctl.conf
mount -t hugetlbfs nodev /mnt/hugepages
```

Platform Notes

```
The Linux run level was 3; sysinfo run-level is incorrect.
The dmidecode memory speed information is incorrect.
```

General Notes

```
Environment variables set by runspec before the start of the run:
HUGETLB_LIMIT = "896"
LD_LIBRARY_PATH = "/root/work/cpu2006/amd1603-rate-libs-revA/32:/root/work/cpu2006/amd1603-rate-libs-revA/64"

The binaries were built with the AMD supported x86 Open64 Compiler Suite,
which is only available from AMD at
http://developer.amd.com/tools-and-sdks/cpu-development/x86-open64-compiler-suite/
Binaries were compiled on a system with 2x AMD Opteron 6378 chips + 128GB Memory using RHEL 6.3

Submitted_by: "Smith, Van" <Van.Smith@amd.com>
Submitted: Mon Aug  7 23:12:47 EDT 2017
Submission: cpu2006-20170807-48147.sub
```

Base Compiler Invocation

C benchmarks:
opencc

C++ benchmarks:
openCC

Base Portability Flags

400.perlbench: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX_X64
401.bzip2: -DSPEC_CPU_LP64
403.gcc: -DSPEC_CPU_LP64
429.mcf: -DSPEC_CPU_LP64
445.gobmk: -DSPEC_CPU_LP64
456.hmmer: -DSPEC_CPU_LP64
458.sjeng: -DSPEC_CPU_LP64
462.libquantum: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX
464.h264ref: -DSPEC_CPU_LP64
483.xalancbmk: -DSPEC_CPU_LINUX

Base Optimization Flags

C benchmarks:
-Ofast -CG:local_sched_alg=1 -INLINE:aggressive=ON -IPA:plimit=8000
-IPA:small_pu=100 -HP:bd=2m:heap=2m -mso -LNO:prefetch=2
-march=bdver1 -mno-fma4 -mno-xop -mno-tbm

C++ benchmarks:
-Ofast -m32 -INLINE:aggressive=on -CG:cmp_peep=on -D__OPEN64_FAST_SET
-march=bdver1 -mno-fma4 -mno-xop -mno-tbm
-L/root/work/libraries/SmartHeap-10/lib -lsmartheap

Peak Compiler Invocation

C benchmarks:
opencc

C++ benchmarks:
openCC

Peak Portability Flags

400.perlbench: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX_X64
401.bzip2: -DSPEC_CPU_LP64
445.gobmk: -DSPEC_CPU_LP64
456.hmmer: -DSPEC_CPU_LP64
458.sjeng: -DSPEC_CPU_LP64
462.libquantum: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX
464.h264ref: -DSPEC_CPU_LP64
473.astar: -DSPEC_CPU_LP64
483.xalancbmk: -DSPEC_CPU_LINUX

Peak Optimization Flags

C benchmarks:

400.perlbench: -fb_create fbdata(pass 1) -fb_opt fbdata(pass 2) -Ofast
-LNO:prefetch=2 -LNO:opt=0 -IPA:plimit=20000
-OPT:unroll_times_max=8 -OPT:unroll_size=256
-OPT:unroll_level=2 -OPT:keep_ext=on -WOPT:if_conv=0
-WOPT:sib=on -CG:local_sched_alg=1 -CG:unroll_fb_req=on
-CG:movext_icmp=off -HP:bd=2m:heap=2m -march=bdver1
-mno-fma4 -GRA:aggr_loop_splitting=off
-GRA:loop_splitting=off

401.bzip2: -fb_create fbdata(pass 1) -fb_opt fbdata(pass 2) -Ofast
-LNO:prefetch=2 -LNO:pf2=0 -OPT:alias=disjoint
-OPT:goto=off -CG:local_sched_alg=1 -HP:bdt=2m:heap=2m
-march=bdver2 -WB, -mno-fma4 -mno-tbm -mno-xop

403.gcc: -fb_create fbdata(pass 1) -fb_opt fbdata(pass 2) -Ofast
-LNO:trip_count=256 -CG:cmp_peep=on -CG:pre_minreg_level=2
-m32 -HP:bdt=2m:heap=2m -GRA:unspill=on -IPA:small_pu=200
-WOPT:sib=on -march=bdver2 -mno-fma4 -WB, -mno-tbm
-mno-xop

429.mcf: -O3 -OPT:unroll_times_max=5 -ipa -INLINE:aggressive=on
-CG:gcm=off -CG:dsched=on -GRA:prioritize_by_density=on
-m32 -HP:bdt=2m:heap=2m -mso -march=bdver1 -mno-fma4

Continued on next page

Peak Optimization Flags (Continued)

445.gobmk: -fb_create fbdata(pass 1) -fb_opt fbdata(pass 2) -Ofast
-OPT:unroll_size=256 -OPT:unroll_times_max=8
-OPT:keep_ext=on -IPA:plimit=750 -IPA:min_hotness=300
-IPA:pu_reorder=1 -LNO:ignore_feedback=off -WOPT:if_conv=2
-HP:bd=2m:heap=2m -march=bdver1 -mno-fma4

456.hmmer: -fb_create fbdata(pass 1) -fb_opt fbdata(pass 2) -Ofast
-LNO:prefetch=2 -OPT:alias=disjoint
-OPT:unroll_times_max=16 -OPT:unroll_size=512
-OPT:unroll_level=2 -OPT:keep_ext=on -CG:cflow=0
-CG:cmp_peep=on -CG:pre_local_sched=off -HP:bdt=2m:heap=2m
-CG:p2align=0 -CG:load_exe=3 -CG:dsched=on -march=bdver1
-mno-fma4

458.sjeng: -fb_create fbdata(pass 1) -fb_opt fbdata(pass 2) -Ofast
-CG:ptr_load_use=0 -CG:divrem_opt=on -CG:movext_icmp=off
-CG:locs_best=on -LNO:full_unroll=10 -IPA:pu_reorder=2
-HP:heap=2m:bd=2m -WOPT:sib=on -march=bdver1 -mno-fma4

462.libquantum: basepeak = yes

464.h264ref: -fb_create fbdata(pass 1) -fb_opt fbdata(pass 2) -O3
-OPT:unroll_size=256 -OPT:unroll_times_max=2
-IPA:plimit=20000 -OPT:alias=disjoint -CG:ptr_load_use=0
-CG:local_sched_alg=1 -HP:bdt=2m:heap=2m -march=bdver1
-mno-fma4

C++ benchmarks:

471.omnetpp: basepeak = yes

473.astar: -fb_create fbdata(pass 1) -fb_opt fbdata(pass 2) -Ofast
-WOPT:if_conv=0 -WOPT:sib=on -CG:divrem_opt=on
-CG:p2align=1 -CG:dsched=on -GRA:optimize_boundary=on
-OPT:alias=disjoint -INLINE:aggressive=on
-IPA:small_pu=3000 -IPA:plimit=3000 -HP:bdt=2m:heap=2m
-march=bdver1 -mno-fma4

483.xalancbmk: -Ofast -LNO:prefetch=2 -OPT:unroll_size=512
-OPT:unroll_times_max=8 -D__OPEN64_FAST_SET
-INLINE:aggressive=on -m32 -CG:cmp_peep=on
-CG:local_sched=off -CG:p2align=1 -GRA:unspill=on
-TENV:frame_pointer=off -fno-emit-exceptions -march=bdver2
-mno-fma4
-L/root/work/libraries/SmartHeap-10/lib -lsmartheap

The flags file that was used to format this result can be browsed at
http://www.spec.org/cpu2006/flags/x86-openflags-rate-revA-I.html

You can also download the XML flags source by saving the following link:
`http://www.spec.org/cpu2006/flags/x86-openflags-rate-revA-I.xml`

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For other inquiries, please contact webmaster@spec.org.

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