



# SPEC® CINT2006 Result

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ASUSTeK Computer Inc.

(Test Sponsor: Advanced Micro Devices)

Asus RS700A-E9,  
AMD EPYC 7351

SPECint®\_rate2006 = 1470

SPECint\_rate\_base2006 = 1330

CPU2006 license: 49

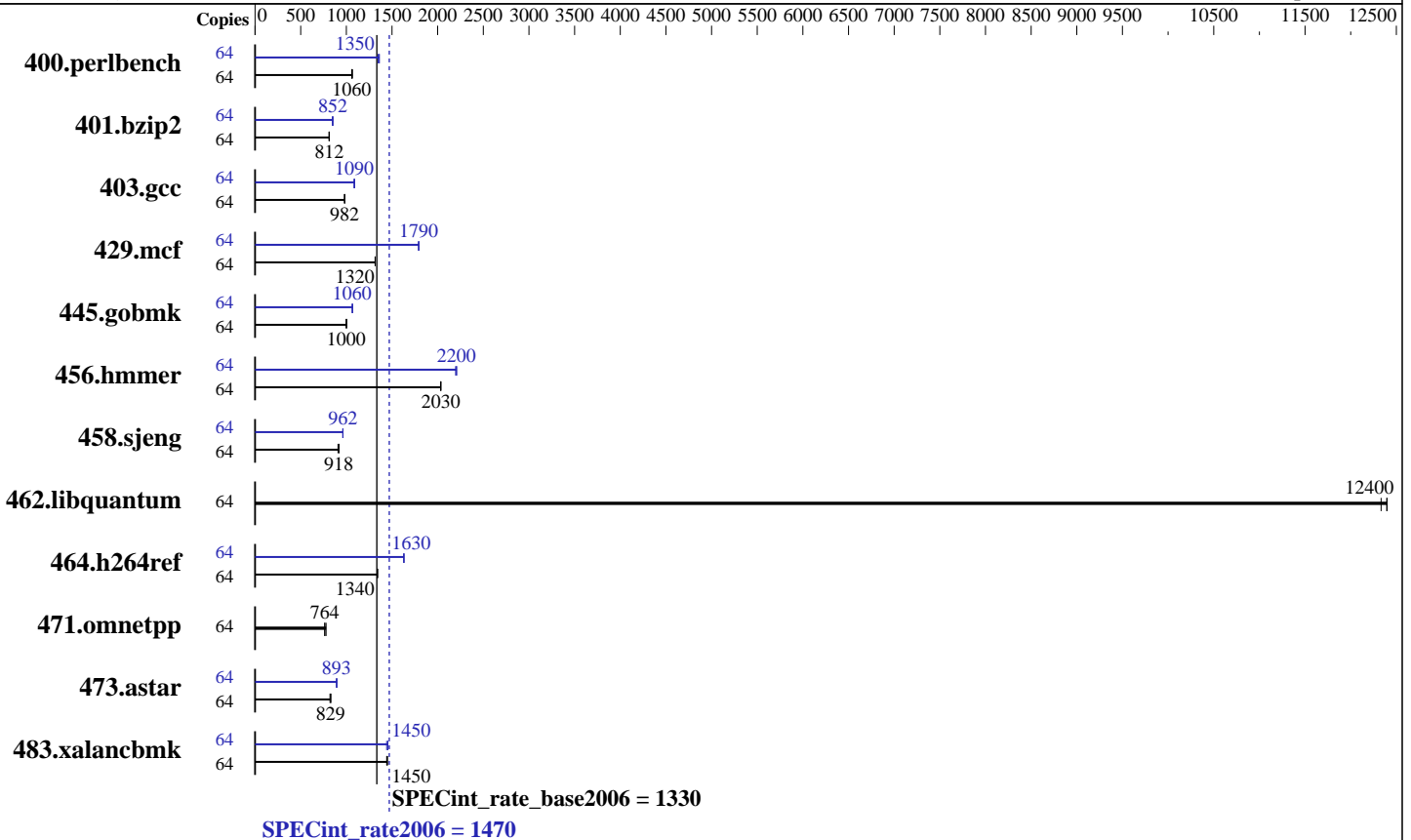
Test sponsor: Advanced Micro Devices

Tested by: Advanced Micro Devices

Test date: Jul-2017

Hardware Availability: Sep-2017

Software Availability: Apr-2016



## Hardware

CPU Name: AMD EPYC 7351  
 CPU Characteristics: AMD Turbo CORE technology up to 2.90 GHz  
 CPU MHz: 2400  
 FPU: Integrated  
 CPU(s) enabled: 32 cores, 2 chips, 16 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 / 2 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	64	586	1070	<u>590</u>	<u>1060</u>	590	1060	64	459	1360	<u>462</u>	<u>1350</u>	464	1350
401.bzip2	64	760	813	762	810	<u>760</u>	<u>812</u>	64	729	847	<u>725</u>	<u>852</u>	724	853
403.gcc	64	524	983	<u>525</u>	<u>982</u>	526	979	64	475	1080	472	1090	<u>474</u>	<u>1090</u>
429.mcf	64	444	1310	<u>444</u>	<u>1320</u>	443	1320	64	<u>326</u>	<u>1790</u>	325	1790	326	1790
445.gobmk	64	<u>671</u>	<u>1000</u>	673	997	669	1000	64	<u>631</u>	<u>1060</u>	631	1060	628	1070
456.hmmer	64	<u>293</u>	<u>2030</u>	293	2040	294	2030	64	270	2210	<u>271</u>	<u>2200</u>	272	2200
458.sjeng	64	853	908	<u>843</u>	<u>918</u>	843	919	64	805	962	<u>805</u>	<u>962</u>	804	963
462.libquantum	64	108	12300	<u>107</u>	<u>12400</u>	107	12400	64	108	12300	<u>107</u>	<u>12400</u>	107	12400
464.h264ref	64	1055	1340	<u>1056</u>	<u>1340</u>	1058	1340	64	869	1630	869	1630	<u>869</u>	<u>1630</u>
471.omnetpp	64	514	778	<u>524</u>	<u>764</u>	524	764	64	514	778	<u>524</u>	<u>764</u>	524	764
473.astar	64	547	821	542	829	<u>542</u>	<u>829</u>	64	501	896	504	892	<u>503</u>	<u>893</u>
483.xalancbmk	64	<u>305</u>	<u>1450</u>	306	1440	304	1450	64	306	1440	304	1450	<u>304</u>	<u>1450</u>

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=57344 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.



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## 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 23:26:10 EDT 2017

Submission: cpu2006-20170807-48149.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



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## 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



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## 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.hmmr: -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:bd=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:bd=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:bd=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>



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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](mailto:webmaster@spec.org).

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