



# SPEC® CINT2006 Result

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## Sugon

SPECint®\_rate2006 = 1470

### Sugon A620-G30 (AMD EPYC 7351)

SPECint\_rate\_base2006 = 1330

CPU2006 license: 9046

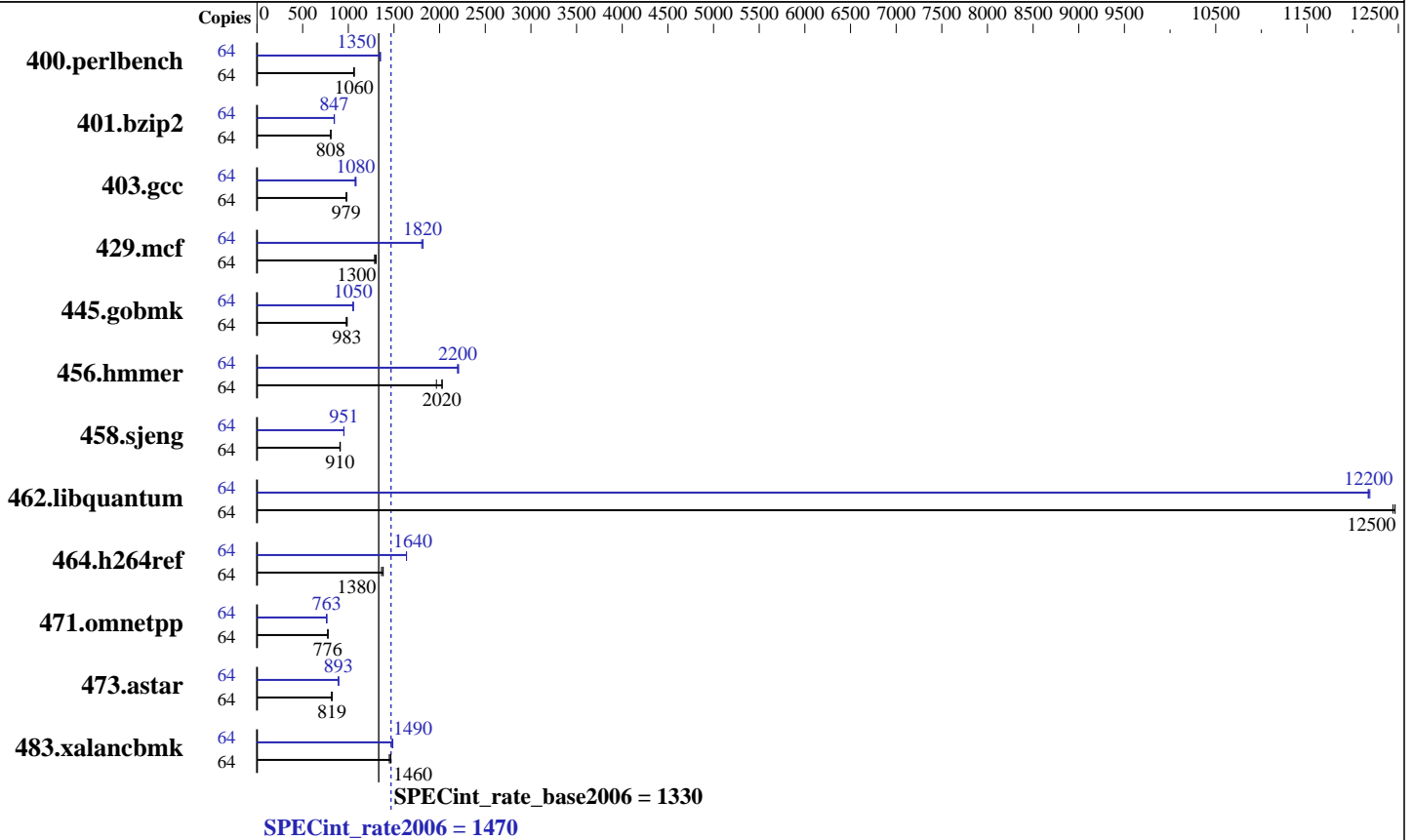
Test sponsor: Sugon

Tested by: Sugon

Test date: Nov-2017

Hardware Availability: Dec-2017

Software Availability: Oct-2017



#### 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 3000 GB SATA, 7200 RPM  
 Other Hardware: None

#### Software

Operating System: Red Hat Enterprise Linux Server 7.4  
 Kernel 3.10.0-693.2.2  
 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 (Multi User)  
 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	587	1060	591	1060	<b>588</b>	<b>1060</b>	64	463	1350	464	1350	<b>463</b>	<b>1350</b>
401.bzip2	64	763	809	765	808	<b>764</b>	<b>808</b>	64	<b>730</b>	<b>847</b>	731	844	729	847
403.gcc	64	<b>526</b>	<b>979</b>	527	978	525	982	64	<b>476</b>	<b>1080</b>	475	1080	480	1070
429.mcf	64	453	1290	<b>450</b>	<b>1300</b>	447	1310	64	324	1800	<b>321</b>	<b>1820</b>	321	1820
445.gobmk	64	<b>683</b>	<b>983</b>	687	977	680	988	64	<b>638</b>	<b>1050</b>	639	1050	635	1060
456.hammer	64	<b>295</b>	<b>2020</b>	304	1960	294	2030	64	<b>271</b>	<b>2200</b>	270	2210	272	2200
458.sjeng	64	849	912	<b>851</b>	<b>910</b>	853	908	64	<b>814</b>	<b>951</b>	813	953	814	951
462.libquantum	64	<b>106</b>	<b>12500</b>	106	12500	107	12400	64	109	12200	109	12200	<b>109</b>	<b>12200</b>
464.h264ref	64	<b>1029</b>	<b>1380</b>	1025	1380	1039	1360	64	865	1640	865	1640	<b>865</b>	<b>1640</b>
471.omnetpp	64	514	778	516	775	<b>516</b>	<b>776</b>	64	526	761	523	765	<b>524</b>	<b>763</b>
473.astar	64	<b>548</b>	<b>819</b>	546	823	550	817	64	<b>503</b>	<b>893</b>	504	891	502	894
483.xalancbmk	64	301	1470	305	1450	<b>302</b>	<b>1460</b>	64	299	1480	297	1490	<b>297</b>	<b>1490</b>

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

BIOS settings:  
Determinism Slider = Power  
cTDP Control = Manual

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## Platform Notes (Continued)

cTDP = 200

This system Sugon A620-G30 is electrically equal with Sugon A420-G30 populated with the same processors and memories.

## General Notes

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

HUGETLB\_LIMIT = "896"

LD\_LIBRARY\_PATH = "/home/cpu2006/amd1603-rate-libs-revB/32:/home/cpu2006/amd1603-rate-libs-revB/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 2 x AMD Opteron 6378 chips + 128 GB Memory using RHEL 6.3

## Base Compiler Invocation

C benchmarks:

openc

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

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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.hmmcr: -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: -Ofast -mso -OPT:unroll\_size=512 -OPT:unroll\_times\_max=16  
 -LNO:prefetch=2 -LNO:prefetch\_ahead=4 -LNO:pf2=0  
 -CG:local\_sched\_alg=1 -CG:p2align=0 -INLINE:aggressive=ON  
 -IPA:plimit=15000 -IPA:small\_pu=100  
 -HP:bd=2m:heap=2m,limit=300 -march=bdver2 -mno-fma4

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: -Ofast -m32 -INLINE:aggressive=on -CG:cmp\_peep=on  
 -WOPT:sib=on -D\_\_OPEN64\_FAST\_SET -march=bdver2 -mno-fma4  
 -L/root/work/libraries/SmartHeap-10/lib -lsmarheap

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 -lsmarheap



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

<http://www.spec.org/cpu2006/flags/x86-openflags-rate-revA-I.html>

<http://www.spec.org/cpu2006/flags/Sugon-Naples-Platform-Settings-revC-I.html>

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

<http://www.spec.org/cpu2006/flags/x86-openflags-rate-revA-I.xml>

<http://www.spec.org/cpu2006/flags/Sugon-Naples-Platform-Settings-revC-I.xml>

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For questions about this result, please contact the tester.  
For other inquiries, please contact [webmaster@spec.org](mailto:webmaster@spec.org).

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