



# SPEC® CINT2006 Result

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## IBM Corporation

**SPECint®\_rate2006 = 352**

IBM System x3755 M3 (AMD Opteron 6168)

**SPECint\_rate\_base2006 = 307**

CPU2006 license: 11

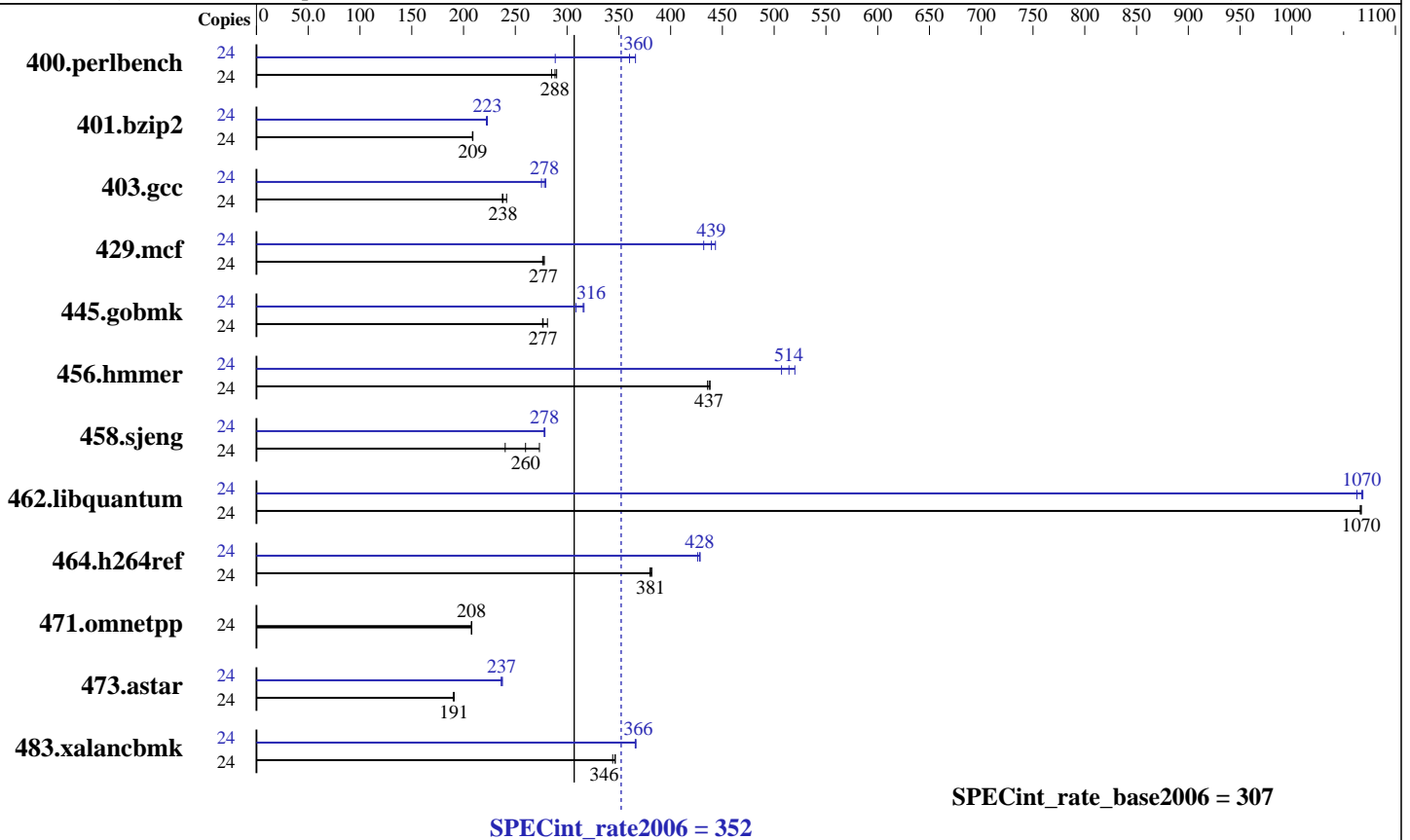
Test date: May-2011

Test sponsor: IBM Corporation

Hardware Availability: Dec-2010

Tested by: IBM Corporation

Software Availability: Jul-2010



### Hardware

CPU Name: AMD Opteron 6168  
 CPU Characteristics:  
 CPU MHz: 1900  
 FPU: Integrated  
 CPU(s) enabled: 24 cores, 2 chips, 12 cores/chip  
 CPU(s) orderable: 2,4 chips  
 Primary Cache: 64 KB I + 64 KB D on chip per core  
 Secondary Cache: 512 KB I+D on chip per core  
 L3 Cache: 12 MB I+D on chip per chip, 6 MB shared / 6 cores  
 Other Cache: None  
 Memory: 64 GB (16 x 4 GB 2Rx4 PC3-10600R-9, ECC)  
 Disk Subsystem: 1 x 250 GB SATA, 7200 RPM  
 Other Hardware: None

### Software

Operating System: SUSE Linux Enterprise Server 11 SP1 (x86\_64), Kernel 2.6.32.12-0.7-default  
 Compiler: x86 Open64 4.2.4 Compiler Suite (from AMD)  
 Auto Parallel: No  
 File System: ext3  
 System State: Run level 3 (Full multiuser with network)  
 Base Pointers: 32/64-bit  
 Peak Pointers: 32/64-bit  
 Other Software: SmartHeap 8.1 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	24	809	290	<b>813</b>	<b>288</b>	823	285	24	813	289	641	366	<b>651</b>	<b>360</b>
401.bzip2	24	<b>1108</b>	<b>209</b>	1110	209	1108	209	24	1043	222	1038	223	<b>1039</b>	<b>223</b>
403.gcc	24	<b>812</b>	<b>238</b>	813	238	800	242	24	702	275	<b>695</b>	<b>278</b>	691	279
429.mcf	24	787	278	792	276	<b>790</b>	<b>277</b>	24	494	443	507	432	<b>498</b>	<b>439</b>
445.gobmk	24	<b>909</b>	<b>277</b>	896	281	911	276	24	<b>798</b>	<b>316</b>	816	309	796	316
456.hammer	24	511	438	514	436	<b>512</b>	<b>437</b>	24	<b>435</b>	<b>514</b>	431	520	442	507
458.sjeng	24	1209	240	<b>1117</b>	<b>260</b>	1063	273	24	<b>1044</b>	<b>278</b>	1042	279	1044	278
462.libquantum	24	466	1070	<b>466</b>	<b>1070</b>	466	1070	24	<b>466</b>	<b>1070</b>	468	1060	465	1070
464.h264ref	24	<b>1395</b>	<b>381</b>	1398	380	1391	382	24	1239	429	<b>1241</b>	<b>428</b>	1246	426
471.omnetpp	24	721	208	722	208	<b>722</b>	<b>208</b>	24	721	208	722	208	<b>722</b>	<b>208</b>
473.astar	24	<b>883</b>	<b>191</b>	886	190	883	191	24	<b>711</b>	<b>237</b>	713	236	709	238
483.xalancbmk	24	478	347	481	344	<b>478</b>	<b>346</b>	24	453	366	<b>452</b>	<b>366</b>	452	367

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

Set vm/nr\_hugepages=10800 in /etc/sysctl.conf  
mount -t hugetlbfs nodev /mnt/hugepages

## Platform Notes

BIOS Settings:  
Operating Mode set to Performance Mode

## General Notes

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

HUGETLB\_LIMIT = "450"

LD\_LIBRARY\_PATH = "/root/speccpu\_2011-03-22/speccpu\_rate\_revC-3/amd1002mc-rate-libs-revC/64:/root/speccpu\_2011-03-22/speccpu\_rate\_revC-3/amd1002mc-rate-libs-revC/32"

The x86 Open64 Compiler Suite is only available from (and supported by) AMD at  
<http://developer.amd.com/cpu/open64>

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## General Notes (Continued)

Binaries were compiled on SLES10 SP2 with binutils 2.18

## 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:

-march=barcelona -mso -Ofast -CG:local\_sched\_alg=1  
 -INLINE:aggressive=on -IPA:plimit=8000 -IPA:small\_pu=100  
 -HP:bdt=2m:heap=2m

C++ benchmarks:

-march=barcelona -mso -Ofast -m32 -INLINE:aggressive=on  
 -CG:cmp\_peep=on -L/root/work/libraries/SmartHeap-8.1/lib -lsmarheap

## Peak Compiler Invocation

C benchmarks:

openc

C++ benchmarks:

openCC



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## 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  
 483.xalanbmk: -DSPEC\_CPU\_LINUX

## Peak Optimization Flags

C benchmarks:

400.perlbench: -march=barcelona -mso -fb\_create fbdata(pass 1)  
 -fb\_opt fbdata(pass 2) -Ofast -IPA:plimit=20000 -LNO:opt=0  
 -OPT:unroll\_times\_max=8 -OPT:unroll\_size=256  
 -OPT:unroll\_level=2 -OPT:keep\_ext=on -WOPT:if\_conv=0  
 -CG:local\_sched\_alg=1 -CG:unroll\_fb\_req=on  
 -HP:bdt=2m:heap=2m

401.bzip2: -march=barcelona -mso -fb\_create fbdata(pass 1)  
 -fb\_opt fbdata(pass 2) -O3 -OPT:alias=disjoint  
 -OPT:goto=off -CG:local\_sched\_alg=1 -HP:bdt=2m:heap=2m

403.gcc: -march=barcelona -mso -fb\_create fbdata(pass 1)  
 -fb\_opt fbdata(pass 2) -Ofast -LNO:trip\_count=256  
 -LNO:prefetch\_ahead=10 -CG:cmp\_peep=on -m32  
 -HP:bdt=2m:heap=2m -GRA:unspill=on -IPA:small\_pu=200

429.mcf: -march=barcelona -mso -O3 -ipa -INLINE:aggressive=on  
 -CG:gcm=off -GRA:prioritize\_by\_density=on -m32  
 -HP:bdt=2m:heap=2m

445.gobmk: -march=barcelona -mso -fb\_create fbdata(pass 1)  
 -fb\_opt fbdata(pass 2) -O3 -OPT:alias=restrict  
 -OPT:unroll\_times\_max=8 -OPT:unroll\_size=256  
 -OPT:unroll\_level=2 -OPT:keep\_ext=on -ipa -IPA:plimit=750  
 -IPA:min\_hotness=300 -IPA:pu\_reorder=1 -LNO:prefetch=1  
 -LNO:ignore\_feedback=off -CG:p2align=on  
 -CG:unroll\_fb\_req=on -HP:bdt=2m:heap=2m

456.hmmer: -march=barcelona -mso -fb\_create fbdata(pass 1)  
 -fb\_opt fbdata(pass 2) -Ofast -LNO:prefetch=0  
 -OPT:alias=disjoint -OPT:unroll\_times\_max=8  
 -OPT:unroll\_size=256 -OPT:unroll\_level=2 -OPT:keep\_ext=on  
 -CG:local\_sched\_alg=1 -CG:cflow=0  
 -CG:push\_pop\_int\_saved\_regs=off -CG:cmp\_peep=on  
 -HP:bdt=2m:heap=2m

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## Peak Optimization Flags (Continued)

458.sjeng: -march=barcelona -mso -fb\_create fbdata(pass 1)  
 -fb\_opt fbdata(pass 2) -O3 -ipa -LNO:ignore\_feedback=off  
 -LNO:full\_unroll=10 -LNO:fusion=0 -LNO:fission=2  
 -IPA:pu\_reorder=2 -CG:ptr\_load\_use=0  
 -OPT:unroll\_times\_max=8 -INLINE:aggressive=on

462.libquantum: -march=barcelona -mso -Ofast -LNO:pf2=0 -CG:gcm=off  
 -CG:use\_prefetchnta=on -CG:cmp\_peep=on -WOPT:aggstr=0  
 -HP:bdt=2m:heap=2m -OPT:alias=disjoint  
 -INLINE:aggressive=on -IPA:space=1000 -IPA:plimit=20000

464.h264ref: -march=barcelona -mso -fb\_create fbdata(pass 1)  
 -fb\_opt fbdata(pass 2) -O3 -IPA:plimit=20000  
 -OPT:alias=disjoint -LNO:prefetch=0 -CG:ptr\_load\_use=0  
 -CG:push\_pop\_int\_saved\_regs=off

C++ benchmarks:

471.omnetpp: basepeak = yes

473.astar: -march=barcelona -mso -fb\_create fbdata(pass 1)  
 -fb\_opt fbdata(pass 2) -Ofast -TENV:frame\_pointer=off  
 -WOPT:if\_conv=0 -GRA:optimize\_boundary=on  
 -OPT:alias=disjoint -INLINE:aggressive=on  
 -IPA:small\_pu=3000 -IPA:plimit=3000 -m32  
 -HP:bdt=2m:heap=2m

483.xalancbmk: -march=barcelona -mso -Ofast -INLINE:aggressive=on -m32  
 -CG:cmp\_peep=on -GRA:unspill=on -TENV:frame\_pointer=off  
 -fno-emit-exceptions  
 -L/root/work/libraries/SmartHeap-8.1/lib -lsmarheap

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

<http://www.spec.org/cpu2006/flags/x86-open64-424-flags-rate-revC.20101109.html>

<http://www.spec.org/cpu2006/flags/amd-platform-rate-revC.html>

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

<http://www.spec.org/cpu2006/flags/x86-open64-424-flags-rate-revC.20101109.xml>

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For other inquiries, please contact [webmaster@spec.org](mailto:webmaster@spec.org).

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