



# SPEC® CINT2006 Result

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## IBM Corporation

IBM System x3755 M3  
(AMD Opteron 6238)

SPECint®\_rate2006 = 409

SPECint\_rate\_base2006 = 358

CPU2006 license: 11

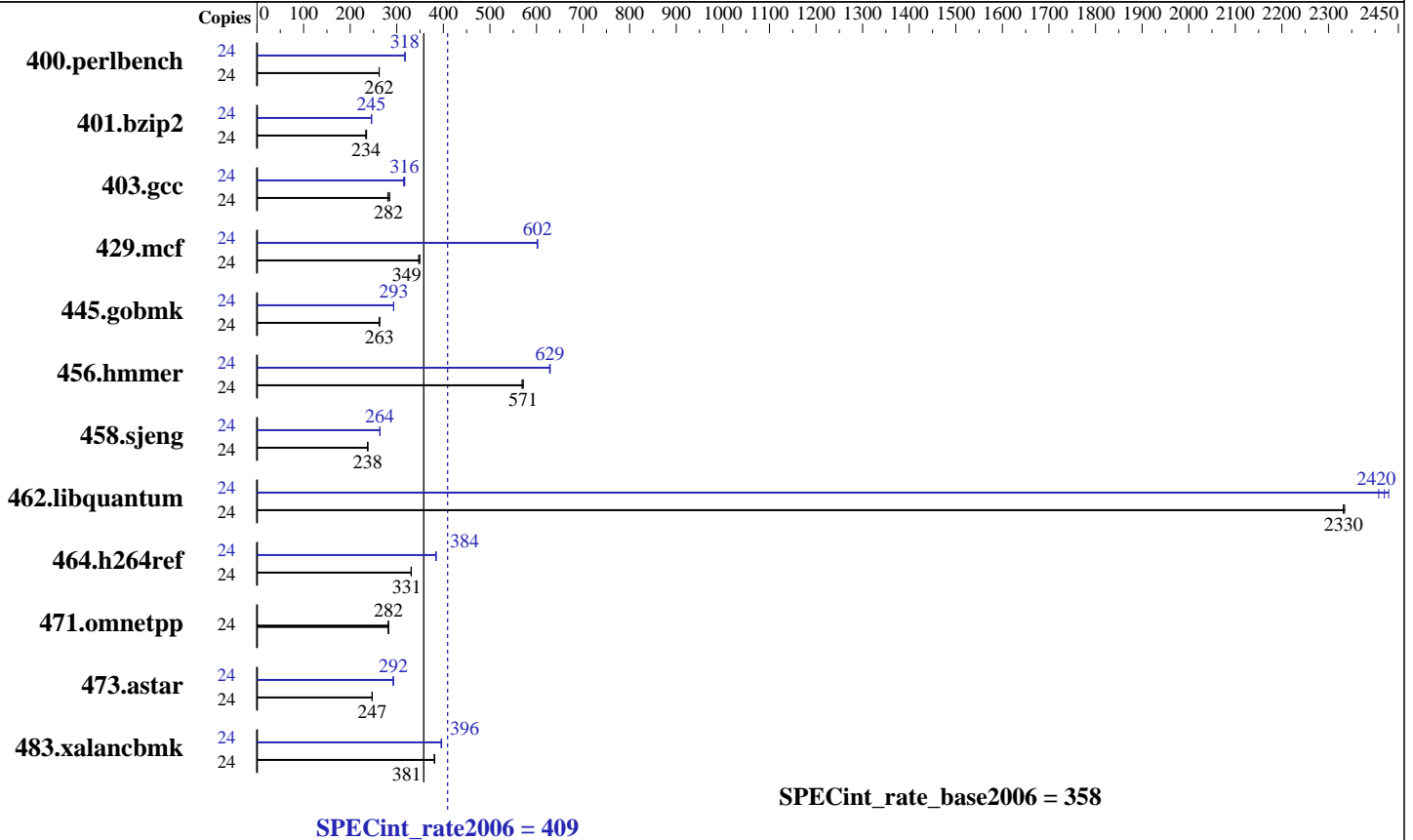
Test sponsor: IBM Corporation

Tested by: IBM Corporation

Test date: Feb-2012

Hardware Availability: Dec-2011

Software Availability: Jul-2011



### Hardware

CPU Name: AMD Opteron 6238  
 CPU Characteristics: AMD Turbo CORE technology up to 3.20 GHz  
 CPU MHz: 2600  
 FPU: Integrated  
 CPU(s) enabled: 24 cores, 2 chips, 12 cores/chip  
 CPU(s) orderable: 1,2 chips  
 Primary Cache: 384 KB I on chip per chip,  
 64 KB I shared / 2 cores;  
 16 KB D on chip per core  
 Secondary Cache: 12 MB I+D on chip per chip, 2 MB shared / 2 cores  
 L3 Cache: 16 MB I+D on chip per chip, 8 MB shared / 6 cores  
 Other Cache: None  
 Memory: 128 GB (16 x 8 GB 2Rx4 PC3-10600R-9, ECC)  
 Disk Subsystem: 1 x 600 GB SATA, 15000 RPM  
 Other Hardware: None

### Software

Operating System: Red Hat Enterprise Linux Server release 6.1,  
 Kernel 2.6.32-131.0.15.el6.x86\_64  
 Compiler: C/C++: Version 4.2.5.2 of x86 Open64 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 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	24	895	262	<b>895</b>	<b>262</b>	894	262	24	<b>738</b>	<b>318</b>	739	317	738	318
401.bzip2	24	<b>989</b>	<b>234</b>	992	234	985	235	24	940	246	944	245	<b>944</b>	<b>245</b>
403.gcc	24	<b>685</b>	<b>282</b>	678	285	688	281	24	<b>611</b>	<b>316</b>	609	317	614	315
429.mcf	24	<b>627</b>	<b>349</b>	631	347	627	349	24	363	602	<b>364</b>	<b>602</b>	364	601
445.gobmk	24	957	263	<b>957</b>	<b>263</b>	959	263	24	<b>858</b>	<b>293</b>	859	293	858	294
456.hammer	24	394	569	<b>392</b>	<b>571</b>	392	571	24	357	628	<b>356</b>	<b>629</b>	356	629
458.sjeng	24	1224	237	1220	238	<b>1221</b>	<b>238</b>	24	1101	264	1100	264	<b>1101</b>	<b>264</b>
462.libquantum	24	213	2330	<b>213</b>	<b>2330</b>	213	2330	24	207	2410	205	2430	<b>205</b>	<b>2420</b>
464.h264ref	24	<b>1604</b>	<b>331</b>	1603	331	1607	331	24	<b>1382</b>	<b>384</b>	1382	384	1382	384
471.omnetpp	24	532	282	<b>532</b>	<b>282</b>	532	282	24	532	282	<b>532</b>	<b>282</b>	532	282
473.astar	24	681	247	<b>682</b>	<b>247</b>	682	247	24	575	293	576	292	<b>576</b>	<b>292</b>
483.xalancbmk	24	434	382	<b>435</b>	<b>381</b>	435	380	24	<b>419</b>	<b>396</b>	418	396	419	395

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 transparent\_hugepage=never as a boot parameter in /boot/grub/menu.lst  
Set kernel/randomize\_va\_space=0 in /etc/sysctl.conf

Set vm/nr\_hugepages=21504 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 = "896"  
LD\_LIBRARY\_PATH = "/root/speccpu-rate-rev1104B1/amd1104-rate-libs-revB/32:/root/speccpu-rate-rev1104B1/amd1104-rate-libs-revB/64"

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## General Notes (Continued)

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

Binaries were compiled on a system with 2x AMD Opteron 6282SE chips + 64GB Memory using RHEL 6.1

## 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:  
  -march=bdver1 -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  
  
C++ benchmarks:  
  -march=bdver1 -Ofast -m32 -INLINE:aggressive=on -CG:cmp\_peep=on  
  -D\_\_OPEN64\_FAST\_SET -L/root/work/libraries/SmartHeap-10/lib -lsmartheap

## Peak Compiler Invocation

C benchmarks:  
  opencc  
  
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.xalancbmk: -DSPEC_CPU_LINUX

```

## Peak Optimization Flags

C benchmarks:

```

400.perlbench: -march=bdver1 -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

401.bzip2: -march=bdver1 -fb_create fbdata(pass 1)
           -fb_opt fbdata(pass 2) -O3 -LNO:prefetch=2 -LNO:pf2=0
           -OPT:alias=disjoint -OPT:goto=off -CG:local_sched_alg=1
           -HP:bd=2m:heap=2m

403.gcc: -march=bdver1 -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:bd=2m:heap=2m -GRA:unspill=on -IPA:small_pu=200
         -WOPT:sib=on

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

445.gobmk: -march=bdver1 -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

456.hmmer: -march=bdver1 -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

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## Peak Optimization Flags (Continued)

458.sjeng: -march=bdver1 -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:bd=2m:heap=2m  
-WOPT:sib=on

462.libquantum: -march=bdver1 -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  
-INLINE:aggressive=on -IPA:plimit=15000 -IPA:small\_pu=100  
-HP:bdt=2m:heap=2m,limit=300

464.h264ref: -march=bdver1 -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

C++ benchmarks:

471.omnetpp: basepeak = yes

473.astar: -march=bdver1 -fb\_create fbdata(pass 1)  
-fb\_opt fbdata(pass 2) -Ofast -TENV:frame\_pointer=off  
-WOPT:if\_conv=0 -WOPT:sib=on -CG:divrem\_opt=on  
-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=bdver1 -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 -GRA:unspill=on -TENV:frame\_pointer=off  
-fno-emit-exceptions  
-L/root/work/libraries/SmartHeap-10/lib -lsmartheap

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

<http://www.spec.org/cpu2006/flags/x86-open64-425-flags-rate-revB.html>  
<http://www.spec.org/cpu2006/flags/amd-platform-rate-revB.20120103.html>

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

<http://www.spec.org/cpu2006/flags/x86-open64-425-flags-rate-revB.xml>  
<http://www.spec.org/cpu2006/flags/amd-platform-rate-revB.20120103.xml>



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

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