



# SPEC® CINT2006 Result

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## IBM Corporation

SPECint®\_rate2006 = 524

IBM System x3755 M3  
(AMD Opteron 6282 SE)

SPECint\_rate\_base2006 = 456

CPU2006 license: 11

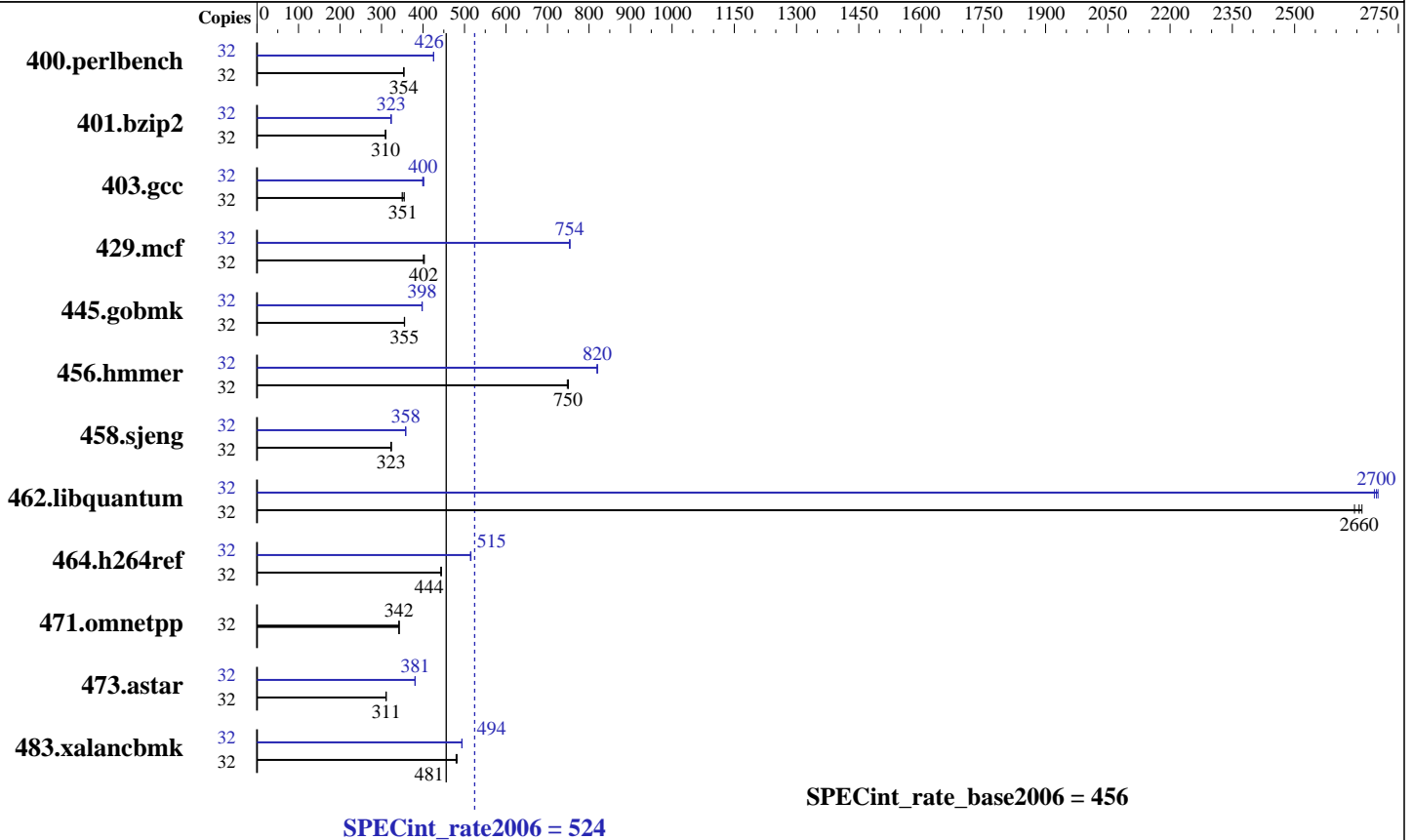
Test date: Nov-2011

Test sponsor: IBM Corporation

Hardware Availability: Dec-2011

Tested by: IBM Corporation

Software Availability: Jul-2011



### Hardware

CPU Name: AMD Opteron 6282 SE  
 CPU Characteristics: AMD Turbo CORE technology up to 3.30 GHz  
 CPU MHz: 2600  
 FPU: Integrated  
 CPU(s) enabled: 32 cores, 2 chips, 16 cores/chip  
 CPU(s) orderable: 2,4 chips  
 Primary Cache: 512 KB I on chip per chip,  
64 KB I shared / 2 cores;  
16 KB D on chip per core  
 Secondary Cache: 16 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 / 8 cores  
 Other Cache: None  
 Memory: 128 GB (16 x 8 GB 2Rx4 PC3L-10600R-9, ECC)  
 Disk Subsystem: 1 x 600 GB SAS, 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: ext4  
 System State: Run level 3 (multi-user)  
 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	32	<b>884</b>	<b>354</b>	884	354	884	354	32	735	425	<b>735</b>	<b>426</b>	734	426
401.bzip2	32	999	309	<b>996</b>	<b>310</b>	995	310	32	<b>956</b>	<b>323</b>	955	323	956	323
403.gcc	32	726	355	737	350	<b>733</b>	<b>351</b>	32	645	399	641	402	<b>644</b>	<b>400</b>
429.mcf	32	<b>727</b>	<b>402</b>	727	401	724	403	32	387	754	388	753	<b>387</b>	<b>754</b>
445.gobmk	32	<b>944</b>	<b>355</b>	944	356	946	355	32	844	398	843	398	<b>844</b>	<b>398</b>
456.hammer	32	398	750	<b>398</b>	<b>750</b>	399	748	32	364	820	364	820	<b>364</b>	<b>820</b>
458.sjeng	32	1200	323	1195	324	<b>1199</b>	<b>323</b>	32	1082	358	1080	358	<b>1081</b>	<b>358</b>
462.libquantum	32	251	2640	249	2660	<b>250</b>	<b>2660</b>	32	246	2690	245	2700	<b>246</b>	<b>2700</b>
464.h264ref	32	1599	443	1594	444	<b>1594</b>	<b>444</b>	32	1374	516	1376	514	<b>1376</b>	<b>515</b>
471.omnetpp	32	584	342	<b>584</b>	<b>342</b>	584	342	32	584	342	<b>584</b>	<b>342</b>	584	342
473.astar	32	<b>722</b>	<b>311</b>	723	311	722	311	32	<b>590</b>	<b>381</b>	590	381	590	381
483.xalancbmk	32	<b>459</b>	<b>481</b>	458	482	460	480	32	447	494	447	493	<b>447</b>	<b>494</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

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=28672 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-rev1104A4/amd1104-rate-libs-revA/32:/root/speccpu-rate-rev1104A4/amd1104-rate-libs-revA/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 6276 chips + 128GB 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-revA.html>  
<http://www.spec.org/cpu2006/flags/amd1104-platform-rate-revA.20111220.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-revA.xml>  
<http://www.spec.org/cpu2006/flags/amd1104-platform-rate-revA.20111220.xml>



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

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