



# SPEC® CINT2006 Result

Copyright 2006-2014 Standard Performance Evaluation Corporation

Dell Inc.

SPECint®\_rate2006 = 697

PowerEdge M915 (AMD Opteron 6168, 1.9 GHz)

SPECint\_rate\_base2006 = 609

CPU2006 license: 55

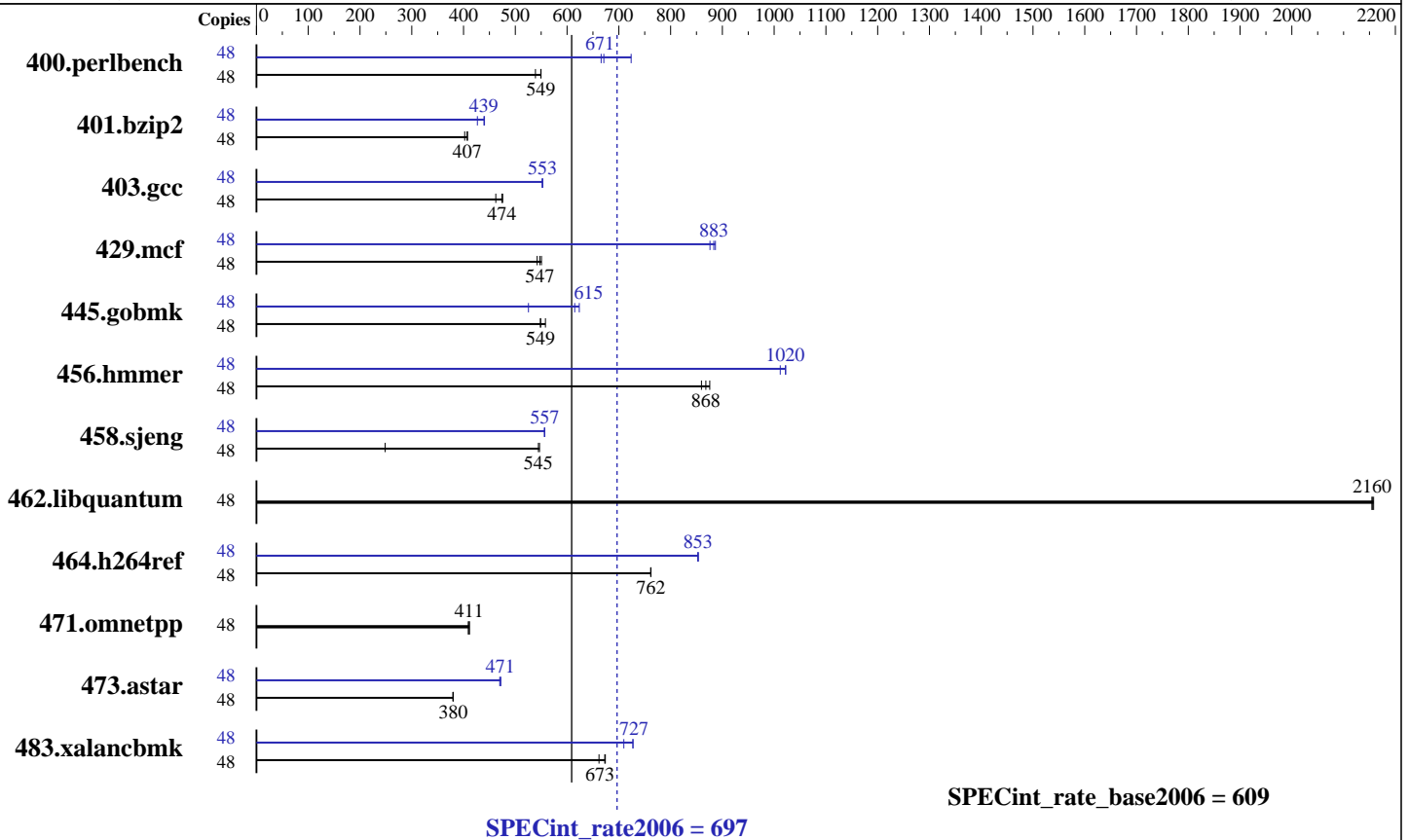
Test date: May-2011

Test sponsor: Dell Inc.

Hardware Availability: May-2011

Tested by: Dell Inc.

Software Availability: Jul-2010



## Hardware

CPU Name: AMD Opteron 6168  
 CPU Characteristics: 1900  
 CPU MHz: Integrated  
 FPU: Integrated  
 CPU(s) enabled: 48 cores, 4 chips, 12 cores/chip  
 CPU(s) orderable: 1,2 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: 128 GB (32 x 4 GB 2Rx4 PC3-10600R-9, ECC)  
 Disk Subsystem: 1 x 146 GB 10000 RPM SAS  
 Other Hardware: None

## Software

Operating System: SUSE Linux Enterprise Server 11 (x86\_64), Kernel 2.6.27.19-5-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	48	870	539	853	550	<b>854</b>	<b>549</b>	48	704	666	<b>699</b>	<b>671</b>	648	724		
401.bzip2	48	1151	402	<b>1138</b>	<b>407</b>	1136	408	48	1085	427	<b>1054</b>	<b>439</b>	1052	440		
403.gcc	48	812	476	836	462	<b>815</b>	<b>474</b>	48	699	553	<b>699</b>	<b>553</b>	700	552		
429.mcf	48	807	542	<b>800</b>	<b>547</b>	795	551	48	494	887	500	876	<b>496</b>	<b>883</b>		
445.gobmk	48	902	558	<b>917</b>	<b>549</b>	918	549	48	958	525	807	624	<b>819</b>	<b>615</b>		
456.hammer	48	<b>516</b>	<b>868</b>	511	876	521	860	48	<b>438</b>	<b>1020</b>	438	1020	443	1010		
458.sjeng	48	<b>1066</b>	<b>545</b>	1062	547	2336	249	48	1043	557	1044	556	<b>1043</b>	<b>557</b>		
462.libquantum	48	462	2150	461	2160	<b>461</b>	<b>2160</b>	48	462	2150	461	2160	<b>461</b>	<b>2160</b>		
464.h264ref	48	<b>1394</b>	<b>762</b>	1395	762	1394	762	48	1246	853	1245	853	<b>1245</b>	<b>853</b>		
471.omnetpp	48	<b>730</b>	<b>411</b>	729	411	733	409	48	<b>730</b>	<b>411</b>	729	411	733	409		
473.astar	48	888	379	<b>887</b>	<b>380</b>	886	380	48	714	472	717	470	<b>715</b>	<b>471</b>		
483.xalancbmk	48	501	662	491	674	<b>492</b>	<b>673</b>	48	467	710	<b>455</b>	<b>727</b>	455	727		

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=21600 in /etc/sysctl.conf  
mount -t hugetlbfs nodev /mnt/hugepages

## General Notes

environment variables set by runspec before the start of the run:  
HUGETLB\_LIMIT = "450"  
LD\_LIBRARY\_PATH = "/root/cpu2006-1.1/amd1002-rate-libs-revC/64:/root/cpu2006-1.1/amd1002-rate-libs-revC/32"

The x86 Open64 Compiler Suite is only available from (and supported by) AMD at  
<http://developer.amd.com/cpu/open64>  
Binaries were compiled on SLES10 SP2 with binutils 2.18



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## 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.hmmr: -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 -lsmartheap

## Peak Compiler Invocation

C benchmarks:  
opencc  
  
C++ benchmarks:  
openCC

## Peak Portability Flags

400.perlbench: -DSPEC\_CPU\_LP64 -DSPEC\_CPU\_LINUX\_X64

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## Peak Portability Flags (Continued)

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=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: basepeak = yes

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.20100901.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.20100901.xml>  
<http://www.spec.org/cpu2006/flags/amd-platform-rate-revC.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).

Tested with SPEC CPU2006 v1.1.  
Report generated on Wed Jul 23 18:24:09 2014 by SPEC CPU2006 PS/PDF formatter v6932.  
Originally published on 7 June 2011.