



# SPEC® CINT2006 Result

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## Dell Inc.

PowerEdge R815  
(AMD Opteron 6274, 2.20 GHz)

SPECint®\_rate2006 = 940

SPECint\_rate\_base2006 = 823

CPU2006 license: 55

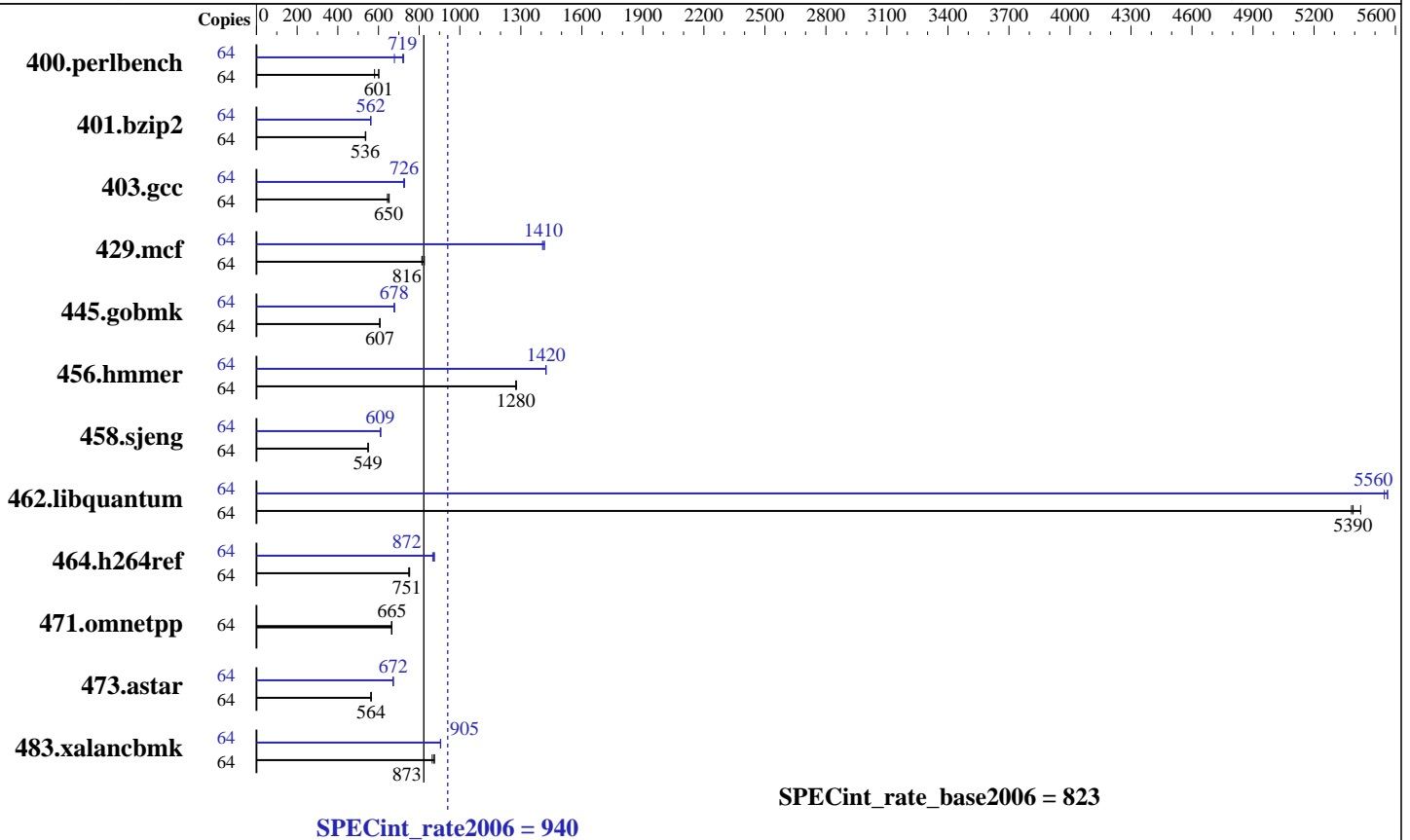
Test sponsor: Dell Inc.

Tested by: Dell Inc.

Test date: Nov-2011

Hardware Availability: Nov-2011

Software Availability: Jul-2011



### Hardware

CPU Name: AMD Opteron 6274  
 CPU Characteristics: AMD Turbo CORE technology up to 3.10 GHz  
 CPU MHz: 2200  
 FPU: Integrated  
 CPU(s) enabled: 64 cores, 4 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: 256 GB (32 x 8 GB 2Rx4 PC3-12800R-11, ECC)  
 Disk Subsystem: 2 x 160 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 (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	64	1040	601	1077	581	<b>1040</b>	<b>601</b>	64	922	678	<b>869</b>	<b>719</b>	864	724		
401.bzip2	64	<b>1152</b>	<b>536</b>	1153	536	1149	537	64	1100	562	<b>1100</b>	<b>562</b>	1098	563		
403.gcc	64	800	644	<b>793</b>	<b>650</b>	789	653	64	<b>709</b>	<b>726</b>	707	728	711	724		
429.mcf	64	<b>716</b>	<b>816</b>	707	826	718	813	64	415	1410	<b>414</b>	<b>1410</b>	412	1420		
445.gobmk	64	<b>1107</b>	<b>607</b>	1107	606	1105	607	64	989	679	<b>990</b>	<b>678</b>	991	677		
456.hammer	64	<b>468</b>	<b>1280</b>	467	1280	468	1280	64	420	1420	<b>419</b>	<b>1420</b>	419	1420		
458.sjeng	64	1409	550	<b>1411</b>	<b>549</b>	1412	549	64	<b>1271</b>	<b>609</b>	1267	611	1271	609		
462.libquantum	64	244	5430	246	5380	<b>246</b>	<b>5390</b>	64	239	5550	238	5560	<b>238</b>	<b>5560</b>		
464.h264ref	64	1891	749	1880	753	<b>1886</b>	<b>751</b>	64	1618	875	<b>1623</b>	<b>872</b>	1634	867		
471.omnetpp	64	<b>601</b>	<b>665</b>	602	664	601	666	64	<b>601</b>	<b>665</b>	602	664	601	666		
473.astar	64	798	563	797	564	<b>797</b>	<b>564</b>	64	<b>668</b>	<b>672</b>	668	673	669	672		
483.xalancbmk	64	511	864	<b>506</b>	<b>873</b>	505	875	64	488	905	488	906	<b>488</b>	<b>905</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

Binaries were compiled on a system with 2x AMD Opteron 6276 chips + 128GB Memory using RHEL 6.1  
Huge pages, transparent Huge pages, and space randomization is controlled with the following settings:  
echo 57344 > /proc/sys/vm/nr\_hugepages  
mount -t hugetlbfs nodev /mnt/hugepages  
echo never > /sys/kernel/mm/redhat\_transparent\_hugepage/enabled  
echo 0 > /proc/sys/kernel/randomize\_va\_space=0

## Platform Notes

'Power Management' set to 'Maximum Performance' in BIOS

## General Notes

Environment variables set by runspec before the start of the run:  
HUGETLB\_LIMIT = "896"  
LD\_LIBRARY\_PATH = "/root/cpu2006-1.1/amd1104-rate-libs-revA/32:/root/cpu2006-1.1/amd1104-rate-libs-revA/64"  
The x86 Open64 Compiler Suite is only available from (and supported by) AMD at

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## General Notes (Continued)

<http://developer.amd.com/cpu/open64>

## 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=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\_peek=on  
-D\_\_OPEN64\_FAST\_SET -L/root/work/libraries/SmartHeap-10/lib -lsmartheap

## 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=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:bd=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:bd=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:bd=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/amd1104-platform-rate-revA.20111122.html>  
<http://www.spec.org/cpu2006/flags/x86-open64-425-flags-rate-revA.html>

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

<http://www.spec.org/cpu2006/flags/amd1104-platform-rate-revA.20111122.xml>  
<http://www.spec.org/cpu2006/flags/x86-open64-425-flags-rate-revA.xml>



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

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