



# SPEC<sup>®</sup> CINT2006 Result

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Dell Inc.

SPECint<sup>®</sup>\_rate2006 = 339

PowerEdge R715 (AMD Opteron 6166 HE, 1.80 GHz)

SPECint\_rate\_base2006 = 294

CPU2006 license: 55

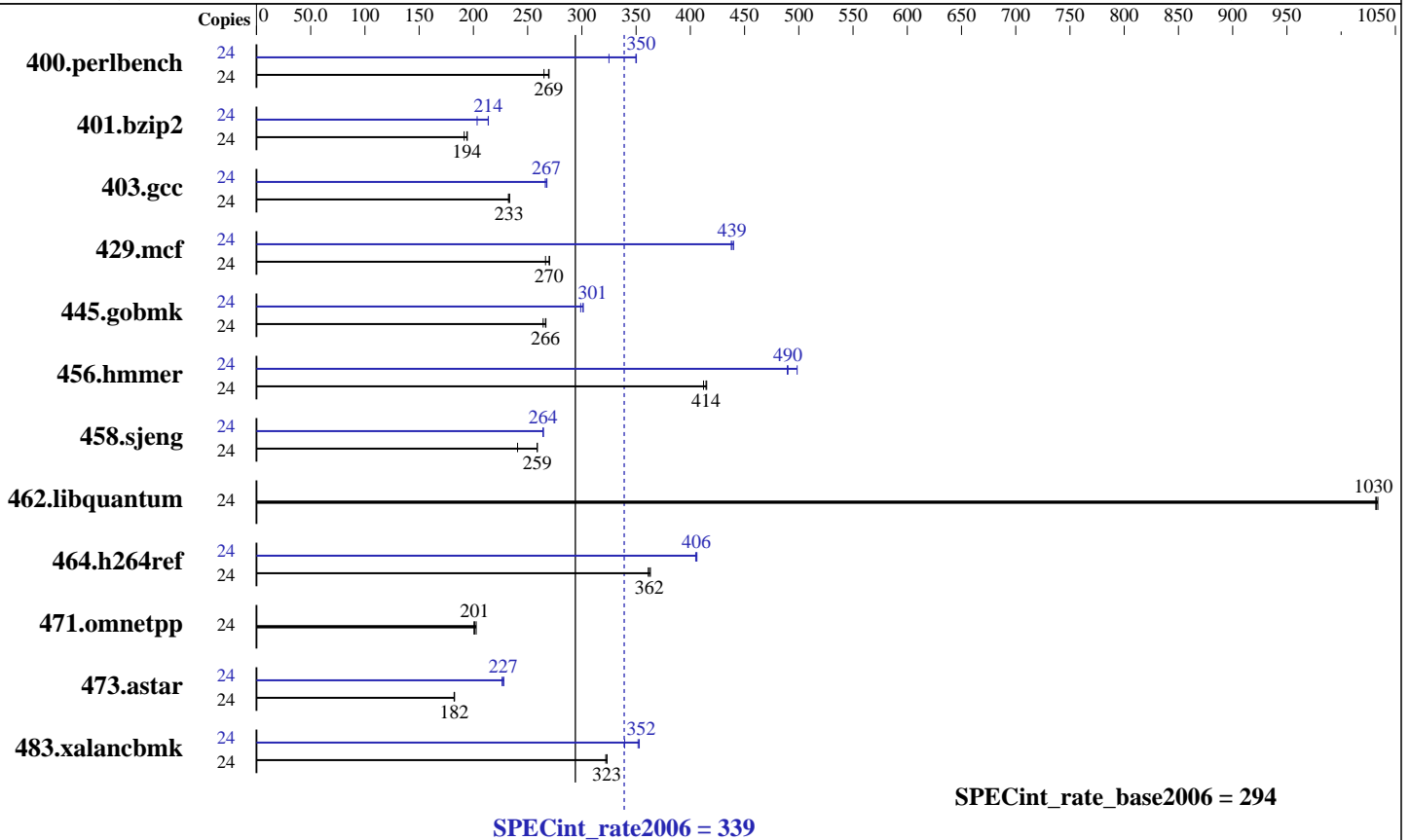
Test date: Oct-2010

Test sponsor: Dell Inc.

Hardware Availability: Feb-2011

Tested by: Dell Inc.

Software Availability: Jan-2011



### Hardware

CPU Name: AMD Opteron 6166 HE  
 CPU Characteristics: 1800  
 CPU MHz: 1800  
 FPU: Integrated  
 CPU(s) enabled: 24 cores, 2 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: 64 GB (16 x 4 GB 2Rx4 PC3-10600R-9, ECC)  
 Disk Subsystem: 1 x 146 GB SAS 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	24	885	265	<b>871</b>	<b>269</b>	869	270	24	722	325	<b>670</b>	<b>350</b>	669	350
401.bzip2	24	1209	192	<b>1193</b>	<b>194</b>	1192	194	24	1138	203	<b>1084</b>	<b>214</b>	1083	214
403.gcc	24	828	233	832	232	<b>829</b>	<b>233</b>	24	721	268	<b>723</b>	<b>267</b>	726	266
429.mcf	24	821	266	810	270	<b>811</b>	<b>270</b>	24	498	440	500	438	<b>499</b>	<b>439</b>
445.gobmk	24	<b>945</b>	<b>266</b>	943	267	953	264	24	<b>836</b>	<b>301</b>	836	301	842	299
456.hammer	24	539	415	543	412	<b>540</b>	<b>414</b>	24	458	489	<b>457</b>	<b>490</b>	449	499
458.sjeng	24	<b>1122</b>	<b>259</b>	1206	241	1122	259	24	1098	264	<b>1099</b>	<b>264</b>	1099	264
462.libquantum	24	482	1030	<b>482</b>	<b>1030</b>	481	1030	24	482	1030	<b>482</b>	<b>1030</b>	481	1030
464.h264ref	24	1471	361	1462	363	<b>1466</b>	<b>362</b>	24	1312	405	1308	406	<b>1309</b>	<b>406</b>
471.omnetpp	24	<b>745</b>	<b>201</b>	748	201	740	203	24	<b>745</b>	<b>201</b>	748	201	740	203
473.astar	24	925	182	<b>924</b>	<b>182</b>	922	183	24	744	226	<b>741</b>	<b>227</b>	739	228
483.xalancbmk	24	512	323	<b>513</b>	<b>323</b>	514	322	24	488	339	<b>471</b>	<b>352</b>	469	353

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:  
Power Management = Maximum Performance (Default = Active Power Controller)

## General Notes

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

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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: 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).

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