



# SPEC® CFP2006 Result

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## Hewlett-Packard Company

SPECfp®\_rate2006 = 146

ProLiant DL165 G6  
(2.8 GHz AMD Opteron 2439 SE)

SPECfp\_rate\_base2006 = 132

CPU2006 license: 3

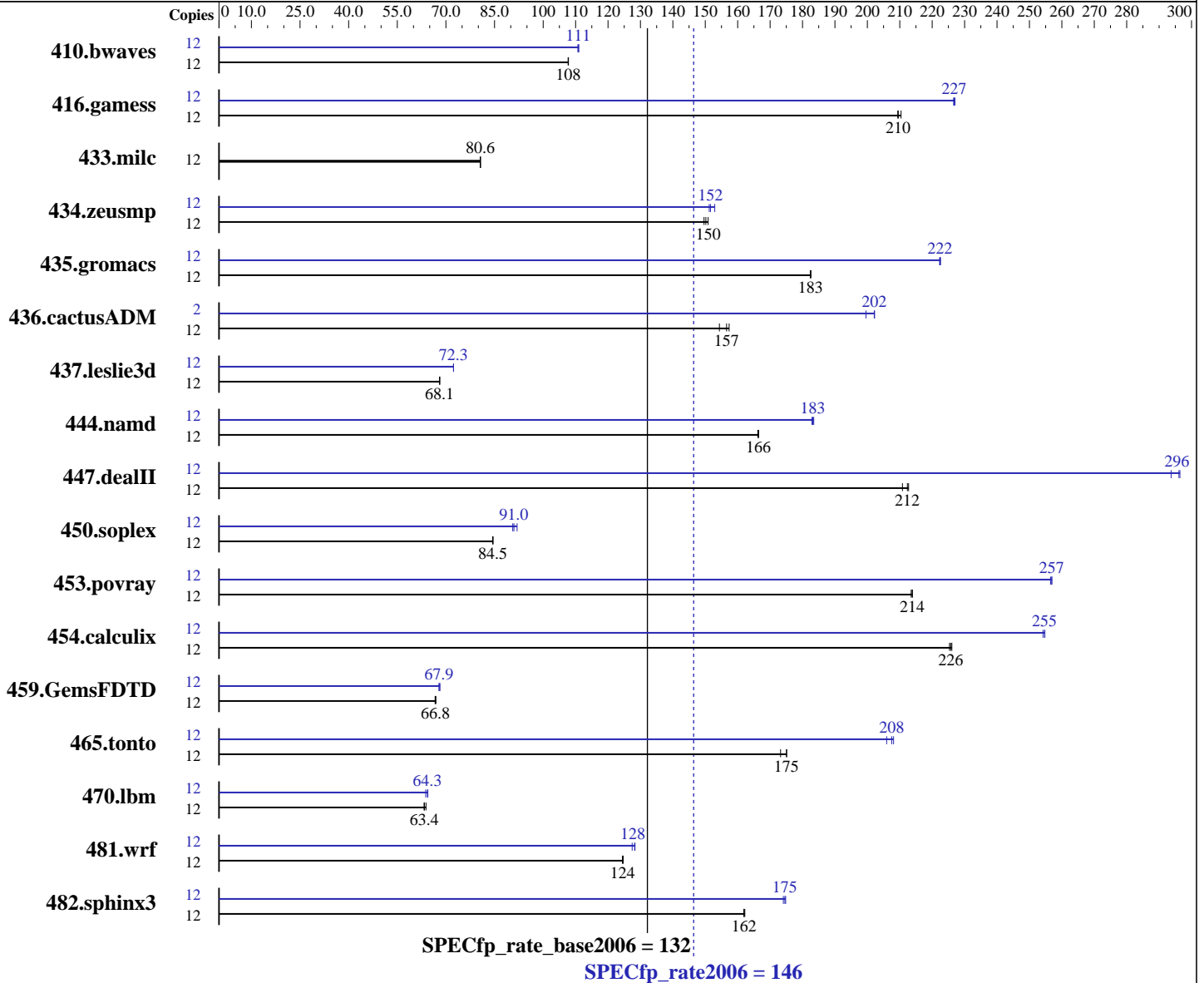
Test date: Jun-2009

Test sponsor: Hewlett-Packard Company

Hardware Availability: Jun-2009

Tested by: Hewlett-Packard Company

Software Availability: Apr-2009



### Hardware

CPU Name: AMD Opteron 2439 SE  
 CPU Characteristics: 2800  
 CPU MHz: Integrated  
 FPU: Integrated  
 CPU(s) enabled: 12 cores, 2 chips, 6 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

Continued on next page

### Software

Operating System: Red Hat Enterprise Linux Server release 5.3, Advanced Platform, Kernel 2.6.18-128.el5  
 Compiler: PGI Server Complete Version 8.0 x86 Open64 4.2.2 Compiler Suite  
 Auto Parallel: Yes  
 File System: ext3  
 System State: Run level 3 (multi-user)  
 Base Pointers: 64-bit  
 Peak Pointers: 32/64-bit

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L3 Cache: 6 MB I+D on chip per chip  
Other Cache: None  
Memory: 32 GB (8x4 GB, PC2-6400P CL5)  
Disk Subsystem: 1 x 146 GB 15 K SAS  
Other Hardware: None

Other Software: binutils 2.18

## Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	12	<b><u>1514</u></b>	<b><u>108</u></b>	1514	108	1513	108	12	1473	111	1469	111	<b><u>1472</u></b>	<b><u>111</u></b>
416.gamess	12	1117	210	1122	209	<b><u>1121</u></b>	<b><u>210</u></b>	12	1037	227	1035	227	<b><u>1036</u></b>	<b><u>227</u></b>
433.milc	12	1366	80.7	<b><u>1366</u></b>	<b><u>80.6</u></b>	1367	80.6	12	1366	80.7	<b><u>1366</u></b>	<b><u>80.6</u></b>	1367	80.6
434.zeusmp	12	730	150	<b><u>727</u></b>	<b><u>150</u></b>	724	151	12	714	153	722	151	<b><u>720</u></b>	<b><u>152</u></b>
435.gromacs	12	470	182	<b><u>469</u></b>	<b><u>183</u></b>	469	183	12	<b><u>385</u></b>	<b><u>222</u></b>	385	222	385	223
436.cactusADM	12	929	154	<b><u>916</u></b>	<b><u>157</u></b>	911	157	2	118	202	120	200	<b><u>118</u></b>	<b><u>202</u></b>
437.leslie3d	12	<b><u>1658</u></b>	<b><u>68.1</u></b>	1657	68.1	1658	68.0	12	<b><u>1559</u></b>	<b><u>72.3</u></b>	1559	72.4	1559	72.3
444.namd	12	579	166	578	166	<b><u>578</u></b>	<b><u>166</u></b>	12	526	183	525	183	<b><u>525</u></b>	<b><u>183</u></b>
447.dealII	12	<b><u>646</u></b>	<b><u>212</u></b>	645	213	651	211	12	<b><u>464</u></b>	<b><u>296</u></b>	467	294	463	296
450.soplex	12	1184	84.5	1186	84.4	<b><u>1185</u></b>	<b><u>84.5</u></b>	12	1105	90.6	<b><u>1100</u></b>	<b><u>91.0</u></b>	1088	92.0
453.povray	12	<b><u>299</u></b>	<b><u>214</u></b>	298	214	299	214	12	<b><u>249</u></b>	<b><u>257</u></b>	248	257	249	257
454.calculix	12	439	225	<b><u>439</u></b>	<b><u>226</u></b>	438	226	12	389	255	<b><u>389</u></b>	<b><u>255</u></b>	389	254
459.GemsFDTD	12	1903	66.9	1910	66.7	<b><u>1907</u></b>	<b><u>66.8</u></b>	12	1868	68.2	1875	67.9	<b><u>1875</u></b>	<b><u>67.9</u></b>
465.tonto	12	674	175	<b><u>675</u></b>	<b><u>175</u></b>	682	173	12	<b><u>569</u></b>	<b><u>208</u></b>	573	206	567	208
470.lbm	12	2606	63.3	<b><u>2602</u></b>	<b><u>63.4</u></b>	2582	63.9	12	<b><u>2565</u></b>	<b><u>64.3</u></b>	2559	64.4	2586	63.8
481.wrf	12	1075	125	1077	124	<b><u>1077</u></b>	<b><u>124</u></b>	12	<b><u>1046</u></b>	<b><u>128</u></b>	1052	127	1045	128
482.sphinx3	12	<b><u>1444</u></b>	<b><u>162</u></b>	1444	162	1442	162	12	1338	175	<b><u>1340</u></b>	<b><u>175</u></b>	1343	174

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  
The libhugetlbfs libraries were installed using the installation rpms that came with the distribution.

Set vm/nr\_hugepages=5400 in /etc/sysctl.conf  
mount -t hugetlbfs nodev /mnt/hugepages



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## General Notes

Environment variables set by runspec before the start of the run:

HUGETLB\_LIMIT = "450"

LD\_LIBRARY\_PATH = "/cpu2006/amd0905is-libs/64:/cpu2006/amd0905is-libs/32"

NCPUS = "6"

PGI\_HUGE\_PAGES = "450"

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

## Base Compiler Invocation

C benchmarks:

pgcc

C++ benchmarks:

pgcpp

Fortran benchmarks:

pgf95

Benchmarks using both Fortran and C:

pgcc pgf95

## Base Portability Flags

```

410.bwaves: -DSPEC_CPU_LP64
416.gamess: -DSPEC_CPU_LP64
433.milc: -DSPEC_CPU_LP64
434.zeusmp: -DSPEC_CPU_LP64
435.gromacs: -DSPEC_CPU_LP64 -Mnomain
436.cactusADM: -DSPEC_CPU_LP64 -Mnomain
437.leslie3d: -DSPEC_CPU_LP64
444.namd: -DSPEC_CPU_LP64
447.deallI: -DSPEC_CPU_LP64
450.soplex: -DSPEC_CPU_LP64
453.povray: -DSPEC_CPU_LP64
454.calculix: -DSPEC_CPU_LP64 -Mnomain
459.GemsFDTD: -DSPEC_CPU_LP64
465.tonto: -DSPEC_CPU_LP64
470.lbm: -DSPEC_CPU_LP64
481.wrf: -DSPEC_CPU_LP64 -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LINUX
482.sphinx3: -DSPEC_CPU_LP64

```



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## Base Optimization Flags

C benchmarks:

-fastsse -Msmartalloc=huge -Mfprelaxed -Mipa=fast -Mipa=inline  
-tp shanghai-64 -Bstatic\_pgi

C++ benchmarks:

-fastsse -Msmartalloc=huge -Mfprelaxed --zc\_eh -Mipa=fast  
-Mipa=inline -tp shanghai-64 -Bstatic\_pgi

Fortran benchmarks:

-fastsse -Msmartalloc=huge -Mfprelaxed -Mvect=short -Mipa=fast  
-Mipa=inline -tp shanghai-64 -Bstatic\_pgi

Benchmarks using both Fortran and C:

-fastsse -Msmartalloc=huge -Mfprelaxed -Mipa=fast -Mipa=inline  
-tp shanghai-64 -Mvect=short -Bstatic\_pgi

## Base Other Flags

C benchmarks:

-Mipa=jobs:4

C++ benchmarks:

-Mipa=jobs:4

Fortran benchmarks:

-Mipa=jobs:4

Benchmarks using both Fortran and C:

-Mipa=jobs:4

## Peak Compiler Invocation

C benchmarks:

pgcc

C++ benchmarks (except as noted below):

openCC

444.namd: pgcpp

Fortran benchmarks (except as noted below):

openf95

410.bwaves: pgf95

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## Peak Compiler Invocation (Continued)

434.zeusmp: pgf95

437.leslie3d: pgf95

Benchmarks using both Fortran and C (except as noted below):

pgcc pgf95

435.gromacs: opencc openf95

## Peak Portability Flags

410.bwaves: -DSPEC\_CPU\_LP64  
 416.gamess: -DSPEC\_CPU\_LP64  
 433.milc: -DSPEC\_CPU\_LP64  
 434.zeusmp: -DSPEC\_CPU\_LP64  
 435.gromacs: -DSPEC\_CPU\_LP64  
 436.cactusADM: -DSPEC\_CPU\_LP64 -Mnomain  
 437.leslie3d: -DSPEC\_CPU\_LP64  
 444.namd: -DSPEC\_CPU\_LP64  
 453.povray: -DSPEC\_CPU\_LP64  
 454.calculix: -DSPEC\_CPU\_LP64 -Mnomain  
 459.GemsFDTD: -DSPEC\_CPU\_LP64  
 465.tonto: -DSPEC\_CPU\_LP64  
 470.lbm: -DSPEC\_CPU\_LP64  
 481.wrf: -DSPEC\_CPU\_LP64 -DSPEC\_CPU\_CASE\_FLAG -DSPEC\_CPU\_LINUX  
 482.sphinx3: -DSPEC\_CPU\_LP64

## Peak Optimization Flags

C benchmarks:

433.milc: basepeak = yes

470.lbm: -fastsse -Msmartalloc=huge -Mprefetch=t0 -Mloop32  
-Mfprelaxed -Mipa=fast -Mipa=inline -tp shanghai-64  
-Bstatic\_pgi

482.sphinx3: -Mphi=indirect(pass 1) -Mpfo=indirect(pass 2)  
-Mipa=fast(pass 2) -Mipa=inline(pass 2) -fastsse  
-Mfprelaxed -Msmartalloc -tp shanghai-64 -Bstatic\_pgi

C++ benchmarks:

444.namd: -Mphi(pass 1) -Mpfo(pass 2) -Mipa=fast(pass 2)  
-Mipa=inline(pass 2) -fastsse -Munroll=n:4 -Munroll=m:8  
-Msmartalloc=huge -Mnodepchk -Mfprelaxed --zc\_eh  
-tp shanghai-64 -Bstatic\_pgi

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## Peak Optimization Flags (Continued)

447.deallI: -march=barcelona -Ofast -static -INLINE:aggressive=on  
-LNO:opt=0 -Wf,-fno-exceptions -m32 -OPT:unroll\_times\_max=8  
-OPT:unroll\_size=256 -OPT:unroll\_level=2 -HP:bdt=2m:heap=2m  
-GRA:unspill=on -CG:cmp\_peep=on -TENV:frame\_pointer=off

450.soplex: -march=barcelona -fb\_create fbdata(pass 1)  
-fb\_opt fbdata(pass 2) -O3 -INLINE:aggressive=on  
-OPT:IEEE\_arith=3 -OPT:IEEE\_NaN\_Inf=off  
-OPT:fold\_unsigned\_relops=on -OPT:malloc\_alg=1  
-CG:load\_exe=0 -fno-exceptions -m32 -HP:bdt=2m

453.povray: -march=barcelona -fb\_create fbdata(pass 1)  
-fb\_opt fbdata(pass 2) -Ofast -INLINE:aggressive=on  
-HP:bdt=2m:heap=2m

### Fortran benchmarks:

410.bwaves: -fastsse -Msmartalloc -Mprefetch=nta -Mfprelaxed  
-Mipa=fast -Mipa=inline -tp shanghai-64 -Bstatic\_pgi

416.gamess: -march=barcelona -fb\_create fbdata(pass 1)  
-fb\_opt fbdata(pass 2) -O2 -OPT:Ofast -OPT:ro=3  
-OPT:unroll\_size=256 -HP:bdt=2m:heap=2m

434.zeusmp: -fastsse -Mfprelaxed -Mprefetch=distance:8 -Mprefetch=t0  
-Msmartalloc=huge -Msmartalloc=hugebss -Mipa=fast  
-Mipa=inline -tp shanghai-64 -Bstatic\_pgi

437.leslie3d: -Mphi=indirect(pass 1) -Mpfo=indirect(pass 2)  
-Mipa=fast(pass 2) -Mipa=inline(pass 2) -fastsse  
-Mvect=fuse -Msmartalloc=huge -Mprefetch=distance:8  
-Mprefetch=t0 -Mfprelaxed -tp shanghai-64 -Bstatic\_pgi

459.GemsFDTD: -march=barcelona -Ofast -LNO:fission=2 -LNO:simd=2  
-LNO:prefetch\_ahead=1 -CG:load\_exe=0 -HP

465.tonto: -march=barcelona -Ofast -OPT:alias=no\_f90\_pointer\_alias  
-LNO:blocking=off -CG:load\_exe=1 -IPA:plimit=525 -HP

### Benchmarks using both Fortran and C:

435.gromacs: -march=barcelona -Ofast -OPT:rsqrt=2 -HP:bdt=2m:heap=2m

436.cactusADM: -fastsse -Mconcur -Msmartalloc=huge -Mfprelaxed -Mipa=fast  
-Mipa=inline -tp shanghai-64 -Bstatic\_pgi

454.calculix: -Mphi=indirect(pass 1) -Mpfo=indirect(pass 2)  
-Mipa=fast(pass 2) -Mipa=inline(pass 2) -fastsse  
-Mvect=short -Msmartalloc=huge -Mprefetch=t0 -Mpre

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## Peak Optimization Flags (Continued)

454.calculix (continued):

-Mfprelaxed -tp shanghai-64 -Bstatic\_pgi

481.wrf: -fastsse -Mvect=noaltcode -Msmartalloc=huge

-Mprefetch=distance:8 -Mfprelaxed -tp shanghai-64

-Bstatic\_pgi

## Peak Other Flags

C benchmarks:

-Mipa=jobs:4(pass 2)

C++ benchmarks:

444.namd: -Mipa=jobs:4(pass 2)

Fortran benchmarks:

410.bwaves: -Mipa=jobs:4

434.zeusmp: -Mipa=jobs:4

437.leslie3d: -Mipa=jobs:4(pass 2)

Benchmarks using both Fortran and C:

436.cactusADM: -Mipa=jobs:4

454.calculix: -Mipa=jobs:4(pass 2)

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

<http://www.spec.org/cpu2006/flags/x86-open64-4.2.2-flags-revA.html>

[http://www.spec.org/cpu2006/flags/pgi80\\_linux\\_flags.html](http://www.spec.org/cpu2006/flags/pgi80_linux_flags.html)

<http://www.spec.org/cpu2006/flags/hp-amd-linux-flags.html>

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

<http://www.spec.org/cpu2006/flags/x86-open64-4.2.2-flags-revA.xml>

[http://www.spec.org/cpu2006/flags/pgi80\\_linux\\_flags.xml](http://www.spec.org/cpu2006/flags/pgi80_linux_flags.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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