



# SPEC<sup>®</sup> CFP2006 Result

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## Hewlett-Packard Company

SPECfp<sup>®</sup>\_rate2006 = 370

ProLiant DL385 G7  
(2.6 GHz AMD Opteron 6282 SE)

SPECfp\_rate\_base2006 = 344

CPU2006 license: 3

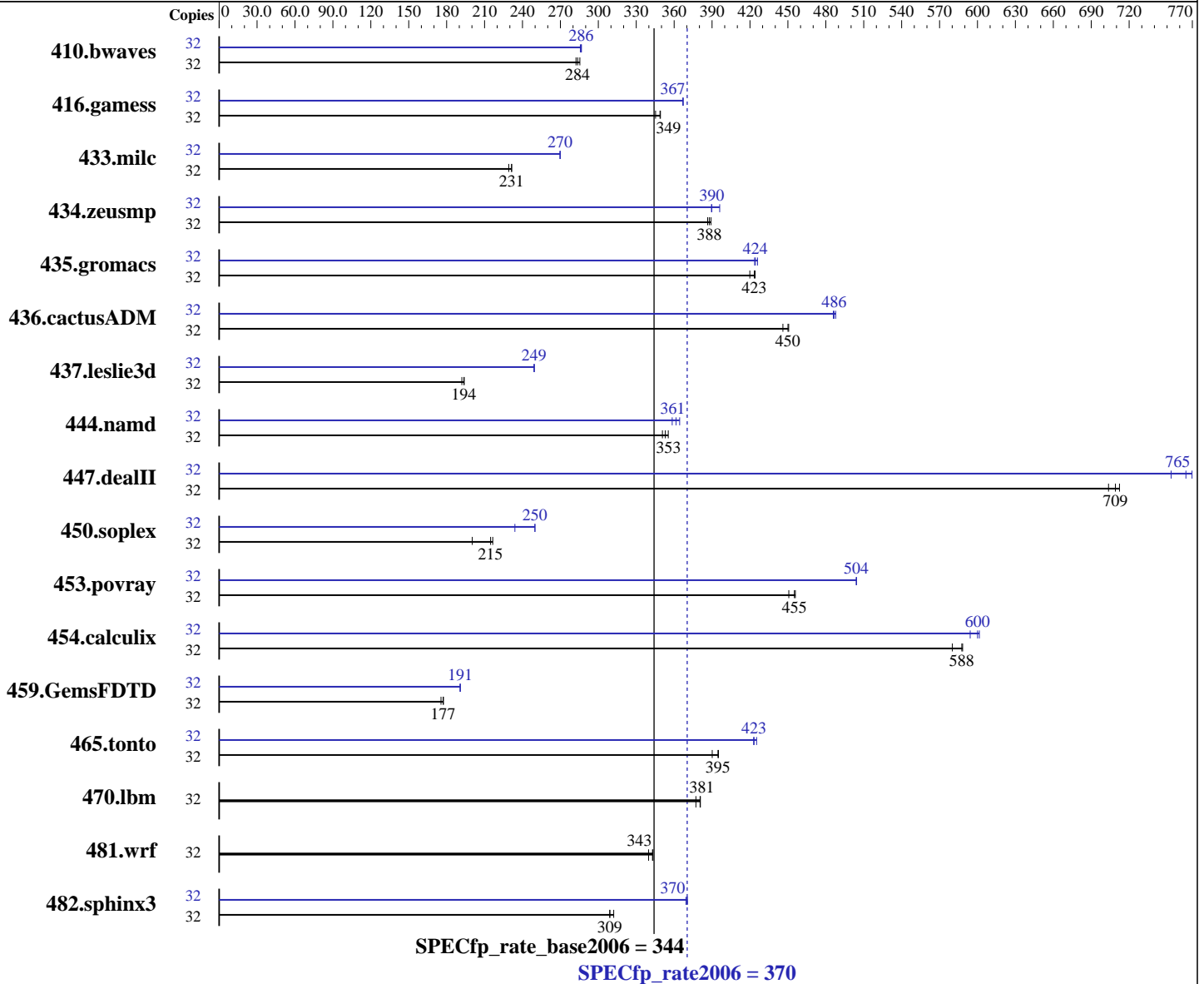
Test date: Oct-2011

Test sponsor: Hewlett-Packard Company

Hardware Availability: Nov-2011

Tested by: Hewlett-Packard Company

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: 1,2 chips

### Software

Operating System: Red Hat Enterprise Linux Server release 6.1, Kernel 2.6.32-131.0.15.el6.x86\_64  
 Compiler: C/C++/Fortran: Version 4.2.5.2 of x86 Open64 Compiler Suite (from AMD)  
 Auto Parallel: No  
 File System: ext3  
 System State: Run level 3 (multi-user)  
 Base Pointers: 64-bit  
 Peak Pointers: 32/64-bit

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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 PC3-10600R-9, ECC)

Disk Subsystem: 1 x 300 GB 7.2 K SATA

Other Hardware: None

Other Software: None

## Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	32	<u>1533</u>	<u>284</u>	1524	285	1540	282	32	1522	286	<u>1518</u>	<u>286</u>	1517	287
416.gamess	32	<u>1796</u>	<u>349</u>	1794	349	1815	345	32	1707	367	<u>1707</u>	<u>367</u>	1707	367
433.milc	32	<u>1270</u>	<u>231</u>	1269	231	1282	229	32	<u>1089</u>	<u>270</u>	1089	270	1089	270
434.zeusmp	32	<u>751</u>	<u>388</u>	748	389	753	387	32	735	396	<u>747</u>	<u>390</u>	748	390
435.gromacs	32	<u>540</u>	<u>423</u>	539	424	544	420	32	536	426	<u>539</u>	<u>424</u>	539	424
436.cactusADM	32	<u>850</u>	<u>450</u>	849	451	857	446	32	784	488	787	486	<u>786</u>	<u>486</u>
437.leslie3d	32	1552	194	<u>1553</u>	<u>194</u>	1566	192	32	<u>1207</u>	<u>249</u>	1207	249	1206	249
444.namd	32	722	355	732	351	<u>727</u>	<u>353</u>	32	716	358	<u>710</u>	<u>361</u>	704	364
447.dealII	32	520	704	<u>516</u>	<u>709</u>	514	712	32	<u>479</u>	<u>765</u>	486	753	476	770
450.soplex	32	1333	200	1233	216	<u>1243</u>	<u>215</u>	32	1141	234	1068	250	<u>1068</u>	<u>250</u>
453.povray	32	<u>374</u>	<u>455</u>	373	456	378	451	32	338	504	338	504	<u>338</u>	<u>504</u>
454.calculix	32	449	588	<u>449</u>	<u>588</u>	455	580	32	439	601	<u>440</u>	<u>600</u>	444	594
459.GemsFDTD	32	1913	177	<u>1915</u>	<u>177</u>	1934	176	32	1780	191	<u>1780</u>	<u>191</u>	1780	191
465.tonto	32	<u>798</u>	<u>395</u>	797	395	807	390	32	740	425	<u>744</u>	<u>423</u>	745	423
470.lbm	32	<u>1155</u>	<u>381</u>	1155	381	1166	377	32	<u>1155</u>	<u>381</u>	1155	381	1166	377
481.wrf	32	1042	343	<u>1042</u>	<u>343</u>	1052	340	32	1042	343	<u>1042</u>	<u>343</u>	1052	340
482.sphinx3	32	1998	312	2018	309	<u>2018</u>	<u>309</u>	32	<u>1686</u>	<u>370</u>	1689	369	1683	371

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 "echo never > /sys/kernel/mm/redhat\_transparent\_hugepage/enabled"

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**CPU2006 license:** 3  
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## Operating System Notes (Continued)

Set "kernel/randomize\_va\_space=0" in /etc/sysctl.conf  
Set vm/nr\_hugepages=28672 in /etc/sysctl.conf  
Set "nodev /mnt/hugepages hugetlbfs defaults 0 0" in /etc/fstab

## Platform Notes

BIOS settings:  
HP Power Profile set to Maximum Performance  
Thermal Configuration set to Increased Cooling

## General Notes

Environment variables set by runspec before the start of the run:  
HUGETLB\_LIMIT = "896"  
LD\_LIBRARY\_PATH = "/cpu2006/amd1104-rate-libs-revA/32:/cpu2006/amd1104-rate-libs-revA/64"  
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:  
opencC  
C++ benchmarks:  
openCC  
Fortran benchmarks:  
openf95  
Benchmarks using both Fortran and C:  
opencC openf95

## 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  
436.cactusADM: -DSPEC\_CPU\_LP64 -fno-second-underscore  
437.leslie3d: -DSPEC\_CPU\_LP64  
444.namd: -DSPEC\_CPU\_LP64  
447.dealII: -DSPEC\_CPU\_LP64

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## Base Portability Flags (Continued)

```

450.soplex: -DSPEC_CPU_LP64
453.povray: -DSPEC_CPU_LP64
454.calculix: -DSPEC_CPU_LP64
459.GemsFDTD: -DSPEC_CPU_LP64
465.tonto: -DSPEC_CPU_LP64
470.lbm: -DSPEC_CPU_LP64
481.wrf: -DSPEC_CPU_LINUX -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LP64
        -fno-second-underscore
482.sphinx3: -DSPEC_CPU_LP64

```

## Base Optimization Flags

C benchmarks:

```

-march=bdver1 -Ofast -OPT:malloc_alg=1 -HP:bd=2m:heap=2m
-IPA:plimit=8000 -IPA:small_pu=100 -mso

```

C++ benchmarks:

```

-march=bdver1 -Ofast -static -CG:load_exe=0 -OPT:malloc_alg=1
-INLINE:aggressive=on -HP:bd=2m:heap=2m -D__OPEN64_FAST_SET

```

Fortran benchmarks:

```

-march=bdver1 -Ofast -LNO:blocking=off -OPT:rsqrt=2
-OPT:unroll_size=256 -HP:bd=2m:heap=2m -mso

```

Benchmarks using both Fortran and C:

```

-march=bdver1 -Ofast -OPT:malloc_alg=1 -HP:bd=2m:heap=2m
-IPA:plimit=8000 -IPA:small_pu=100 -mso -LNO:blocking=off
-OPT:rsqrt=2 -OPT:unroll_size=256

```

## Peak Compiler Invocation

C benchmarks:

opencc

C++ benchmarks:

openCC

Fortran benchmarks:

openf95

Benchmarks using both Fortran and C:

opencc openf95



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## 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 -fno-second-underscore
437.leslie3d: -DSPEC_CPU_LP64
444.namd: -DSPEC_CPU_LP64
453.povray: -DSPEC_CPU_LP64
454.calculix: -DSPEC_CPU_LP64
459.GemsFDTD: -DSPEC_CPU_LP64
465.tonto: -DSPEC_CPU_LP64
470.lbm: -DSPEC_CPU_LP64
481.wrf: -DSPEC_CPU_LINUX -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LP64
-fno-second-underscore
482.sphinx3: -DSPEC_CPU_LP64

```

## Peak Optimization Flags

C benchmarks:

```

433.milc: -march=bdver1 -Ofast -CG:movnti=1 -CG:locs_best=on
-HP:bdt=2m:heap=2m -IPA:plimit=7000 -IPA:callee_limit=1200
-OPT:struct_array_copy=2 -OPT:alias=field_sensitive -mso

470.lbm: basepeak = yes

482.sphinx3: -march=bdver1 -fb_create fbdata(pass 1)
-fb_opt fbdata(pass 2) -Ofast -OPT:malloc_alg=2
-CG:cmp_peep=on -CG:local_sched_alg=2 -INLINE:aggressive=on
-LNO:prefetch=2 -LNO:prefetch_ahead=4 -mso

```

C++ benchmarks:

```

444.namd: -march=bdver1 -fb_create fbdata(pass 1)
-fb_opt fbdata(pass 2) -Ofast -LNO:ignore_feedback=off
-CG:local_sched_alg=2 -CG:load_exe=0 -OPT:unroll_size=256
-fno-exceptions -HP:bdt=2m:heap=2m

447.dealII: -march=bdver1 -Ofast -D__OPEN64_FAST_SET -static
-INLINE:aggressive=on -LNO:opt=0 -LNO:simd=0
-fno-emit-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 -CG:movext_icmp=off
-TENV:frame_pointer=off

450.soplex: -march=bdver1 -fb_create fbdata(pass 1)
-fb_opt fbdata(pass 2) -O3 -INLINE:aggressive=on -OPT:RO=1
-OPT:IEEE_arith=3 -OPT:IEEE_NaN_Inf=off

```

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## Peak Optimization Flags (Continued)

450.soplex (continued):

-OPT:fold\_unsigned\_relops=on -fno-exceptions -m32  
-HP:bdt=2m:heap=2m -WOPT:sib=on

453.povray:

-march=bdver1 -fb\_create fbdata(pass 1)  
-fb\_opt fbdata(pass 2) -Ofast -CG:pre\_local\_sched=off  
-INLINE:aggressive=on -HP:bd=2m:heap=2m -OPT:transform=2  
-OPT:alias=disjoint -WOPT:aggcm=0

Fortran benchmarks:

410.bwaves:

-march=bdver1 -fb\_create fbdata(pass 1)  
-fb\_opt fbdata(pass 2) -Ofast -OPT:Ofast -OPT:treeheight=on  
-LNO:blocking=off -LNO:ignore\_feedback=off -LNO:fu=4  
-LNO:loop\_model\_simd=on -LNO:simd\_rm\_unity\_remainder=on  
-WOPT:aggstr=0 -HP:bdt=2m:heap=2m -CG:cmp\_peep=on

416.gamess:

-march=bdver1 -fb\_create fbdata(pass 1)  
-fb\_opt fbdata(pass 2) -O3 -LNO:fu=6 -LNO:blocking=0  
-LNO:simd=0 -OPT:Ofast -OPT:ro=3 -OPT:unroll\_size=256  
-OPT:unroll\_times\_max=2 -CG:local\_sched\_alg=1  
-HP:bdt=2m:heap=2m -WOPT:sib=on

434.zeusmp:

-march=bdver1 -Ofast -LNO:blocking=off -LNO:interchange=off  
-HP:bdt=2m:heap=2m

437.leslie3d:

-march=bdver1 -Ofast -CG:pre\_minreg\_level=2 -LNO:simd=0  
-LNO:fusion=2 -HP:bdt=2m:heap=2m -mso

459.GemsFDTD:

-march=bdver1 -Ofast -OPT:unroll\_size=0 -LNO:fission=2  
-CG:load\_exe=0 -CG:local\_sched\_alg=2 -HP

465.tonto:

-march=bdver1 -Ofast -OPT:alias=no\_f90\_pointer\_alias  
-LNO:blocking=off -CG:load\_exe=1 -IPA:plimit=525  
-HP:bdt=2m:heap=2m

Benchmarks using both Fortran and C:

435.gromacs:

-march=bdver1 -fb\_create fbdata(pass 1)  
-fb\_opt fbdata(pass 2) -Ofast -OPT:rsqrt=2  
-HP:bdt=2m:heap=2m

436.cactusADM:

-march=bdver1 -fb\_create fbdata(pass 1)  
-fb\_opt fbdata(pass 2) -Ofast -LNO:blocking=off  
-LNO:prefetch=2 -HP -CG:locs\_shallow\_depth=1 -CG:load\_exe=0  
-WOPT:sib=on

454.calculix:

-march=bdver1 -Ofast -OPT:unroll\_size=256  
-GRA:optimize\_boundary=on -HP:bdt=2m:heap=2m

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## Peak Optimization Flags (Continued)

481.wrf: basepeak = yes

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/hp-amd-linux-flags.20100330.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/hp-amd-linux-flags.20100330.xml>

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

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