# SPEC® CFP2006 Result

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## Hewlett-Packard Company

Proliant DL320 G5p
(2.40 GHz, Intel Xeon processor X3220)

$SPECfp^{®}\_rate2006 =$ 42.4

$SPECfp\_rate\_base2006 =$ 39.8

**CPU2006 license:** 3
**Test sponsor:** Hewlett-Packard Company
**Tested by:** Hewlett-Packard Company

**Test date:** Nov-2007
**Hardware Availability:** Nov-2007
**Software Availability:** Nov-2007

| Copies | | Benchmark | Result |
|---|---|---|---|
| | 410.bwaves | 4 | 31.9 |
| | | 4 | 31.5 |
| | 416.gamess | 4 | 68.4 |
| | | 4 | 67.5 |
| | 433.milc | 4 | 25.0 |
| | | 4 | 24.7 |
| | 434.zeusmp | 4 | 42.7 |
| | | 4 | 44.0 |
| | 435.gromacs | 4 | 58.9 |
| | | 4 | 58.1 |
| | 436.cactusADM | 1 | 55.2 |
| | | 4 | 49.3 |
| | 437.leslie3d | 4 | 21.0 |
| | | 4 | 21.0 |
| | 444.namd | 4 | 50.9 |
| | | 4 | 50.6 |
| | 447.dealII | 4 | 81.7 |
| | | 4 | 76.5 |
| | 450.soplex | 4 | 28.7 |
| | | 4 | 26.7 |
| | 453.povray | 4 | 90.1 |
| | | 4 | 76.6 |
| | 454.calculix | 4 | 69.2 |
| | | 4 | 49.5 |
| | 459.GemsFDTD | 4 | 20.6 |
| | | 4 | 20.5 |
| | 465.tonto | 4 | 51.6 |
| | | 4 | 50.1 |
| | 470.lbm | 2 | 23.8 |
| | | 4 | 19.3 |
| | 481.wrf | 4 | 37.4 |
| | | 4 | 37.7 |
| | 482.sphinx3 | 4 | 41.1 |
| | | 4 | 39.1 |

**SPECfp_rate_base2006 = 39.8**

**SPECfp_rate2006 = 42.4**

## Hardware

CPU Name: Intel Xeon X3220
CPU Characteristics: 2.40 GHz, 2x4 MB L2 shared, 1066 MHz system bus
CPU MHz: 2400
FPU: Integrated
CPU(s) enabled: 4 cores, 1 chip, 4 cores/chip
CPU(s) orderable: 1 chip
Primary Cache: 32 KB I + 32 KB D on chip per core
Secondary Cache: 8 MB I+D on chip per chip, 4 MB shared / 2 cores

**Continued on next page**

## Software

Operating System: SUSE Linux Enterprise Server 10 (x86_64) SP1 kernel 2.6.16.46-0.12-smp
Compiler: Intel C++ and Fortran Compiler for Linux32 and Linux64 version 10.1 Build 20070824
Auto Parallel: Yes
File System: ext2
System State: Multi-user run level 3
Base Pointers: 32/64-bit

**Continued on next page**

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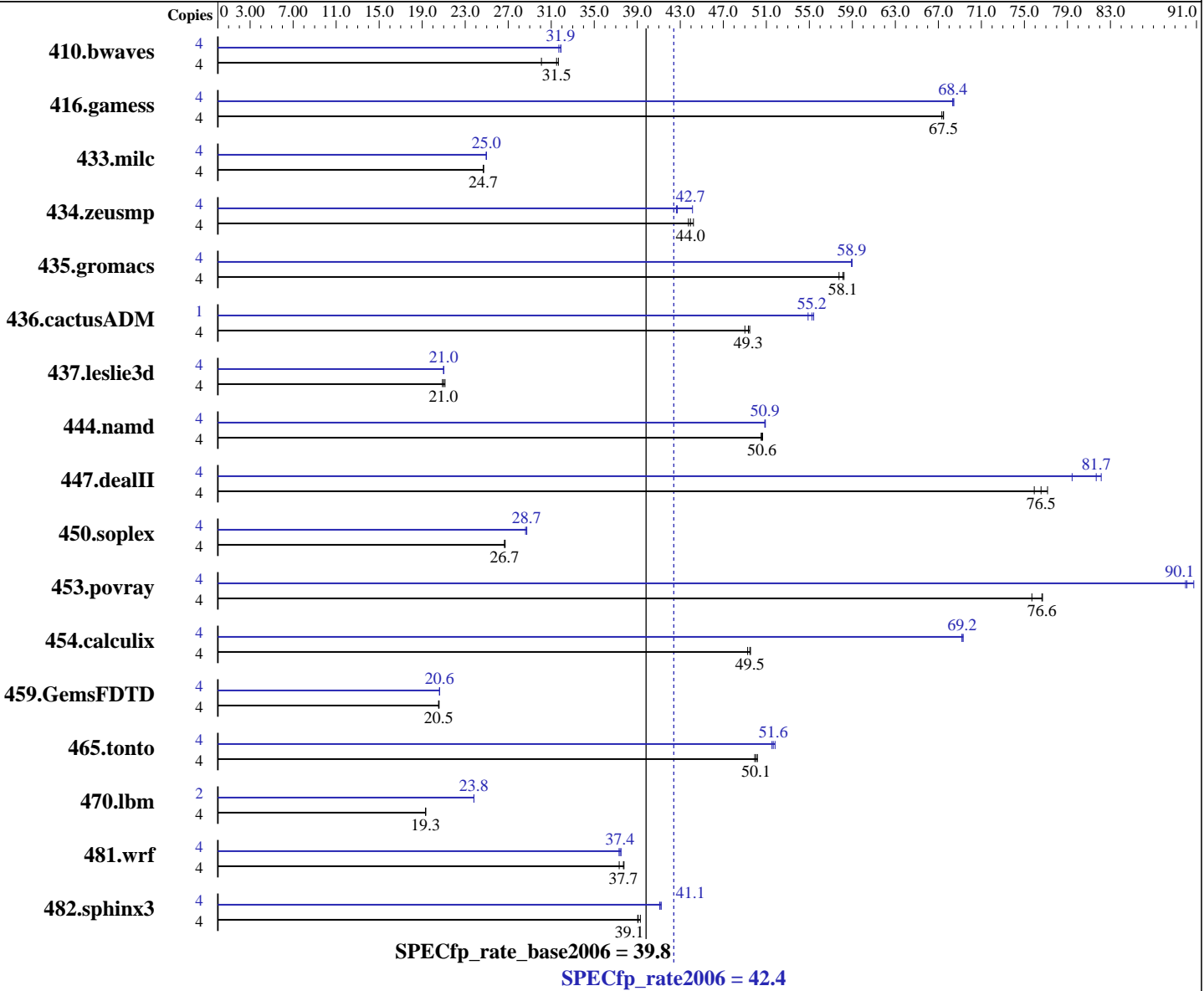| | |
|---|---|
| **CPU2006 license:** 3 | **Test date:** Nov-2007 |
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| | | | |
|---|---|---|---|
| L3 Cache: | None | Peak Pointers: | 32/64-bit |
| Other Cache: | None | Other Software: | binutils-2.17.50 |
| Memory: | 8 GB (4x2 GB PC2-6400E CL5) | | |
| Disk Subsystem: | 1x160 GB 7.2 K SATA | | |
| Other Hardware: | None | | |

## Results Table

| Benchmark | Base | | | | | | Peak | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 410.bwaves | 4 | 1807 | 30.1 | 1717 | 31.7 | **1726** | **31.5** | 4 | 1714 | 31.7 | 1704 | 31.9 | **1705** | **31.9** |
| 416.gamess | 4 | **1161** | **67.5** | 1161 | 67.5 | 1163 | 67.3 | 4 | 1146 | 68.3 | 1144 | 68.4 | **1146** | **68.4** |
| 433.milc | 4 | 1487 | 24.7 | 1486 | 24.7 | **1487** | **24.7** | 4 | 1472 | 24.9 | 1470 | 25.0 | **1470** | **25.0** |
| 434.zeusmp | 4 | 832 | 43.8 | **828** | **44.0** | 823 | 44.2 | 4 | 825 | 44.1 | **852** | **42.7** | 854 | 42.6 |
| 435.gromacs | 4 | **491** | **58.1** | 490 | 58.2 | 494 | 57.8 | 4 | 485 | 58.9 | 484 | 59.0 | **485** | **58.9** |
| 436.cactusADM | 4 | 975 | 49.0 | **969** | **49.3** | 966 | 49.5 | 1 | 218 | 54.9 | 216 | 55.4 | **216** | **55.2** |
| 437.leslie3d | 4 | 1800 | 20.9 | 1780 | 21.1 | **1791** | **21.0** | 4 | 1792 | 21.0 | 1789 | 21.0 | **1790** | **21.0** |
| 444.namd | 4 | **634** | **50.6** | 635 | 50.5 | 633 | 50.7 | 4 | 630 | 50.9 | **631** | **50.9** | 631 | 50.9 |
| 447.dealII | 4 | 593 | 77.2 | **598** | **76.5** | 603 | 75.9 | 4 | **560** | **81.7** | 557 | 82.1 | 576 | 79.4 |
| 450.soplex | 4 | **1251** | **26.7** | 1251 | 26.7 | 1249 | 26.7 | 4 | **1162** | **28.7** | 1166 | 28.6 | 1161 | 28.7 |
| 453.povray | 4 | 281 | 75.7 | **278** | **76.6** | 277 | 76.7 | 4 | **236** | **90.1** | 236 | 90.0 | 234 | 90.8 |
| 454.calculix | 4 | 666 | 49.5 | **667** | **49.5** | 670 | 49.3 | 4 | **477** | **69.2** | 477 | 69.2 | 476 | 69.3 |
| 459.GemsFDTD | 4 | 2063 | 20.6 | 2068 | 20.5 | **2065** | **20.5** | 4 | 2059 | 20.6 | 2058 | 20.6 | **2058** | **20.6** |
| 465.tonto | 4 | 784 | 50.2 | **786** | **50.1** | 788 | 49.9 | 4 | 764 | 51.5 | **762** | **51.6** | 760 | 51.8 |
| 470.lbm | 4 | 2844 | 19.3 | 2845 | 19.3 | **2845** | **19.3** | 2 | 1154 | 23.8 | **1154** | **23.8** | 1154 | 23.8 |
| 481.wrf | 4 | **1185** | **37.7** | 1197 | 37.3 | 1183 | 37.8 | 4 | **1195** | **37.4** | 1198 | 37.3 | 1192 | 37.5 |
| 482.sphinx3 | 4 | 1984 | 39.3 | **1995** | **39.1** | 1997 | 39.0 | 4 | 1898 | 41.1 | 1891 | 41.2 | **1895** | **41.1** |

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

## Operating System Notes

```
'ulimit -s unlimited' was used to set the stacksize to unlimited
'/usr/bin/taskset' used to bind processes to CPUs
OMP_NUM_THREADS set to number of cores
KMP_AFFINITY set to physical,0
KMP_STACKSIZE set to 64M
```

## Platform Notes

```
BIOS configuration:
  Power Regulator set to Static High Performance Mode
  Adjacent Sector Prefetch Disabled
  Hardware Prefetcher Disabled
```

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# Base Compiler Invocation

C benchmarks:
        icc

C++ benchmarks:
        icpc

Fortran benchmarks:
        ifort

Benchmarks using both Fortran and C:
        icc ifort

# 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 -nofor_main
      436.cactusADM: -DSPEC_CPU_LP64 -nofor_main
        437.leslie3d: -DSPEC_CPU_LP64
          444.namd: -DSPEC_CPU_LP64
          447.dealII: -DSPEC_CPU_LP64
         450.soplex: -DSPEC_CPU_LP64
         453.povray: -DSPEC_CPU_LP64
        454.calculix: -DSPEC_CPU_LP64 -nofor_main
      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

# Base Optimization Flags

C benchmarks:
        -fast

C++ benchmarks:
        -fast

Fortran benchmarks:
        -fast

Benchmarks using both Fortran and C:
        -fast

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# Peak Compiler Invocation

C benchmarks (except as noted below):
```
/home/cmplr/usr3/alrahate/compilers/ic10.1mainline/20070725/Linux32/bin/icc
-L/home/cmplr/usr3/alrahate/compilers/ic10.1mainline/20070725/Linux32/lib
-I/home/cmplr/usr3/alrahate/compilers/ic10.1mainline/20070725/Linux32/include
```

433.milc: `icc`

C++ benchmarks (except as noted below):
```
icpc
```

450.soplex: `/home/cmplr/usr3/alrahate/compilers/ic10.1mainline/20070725/Linux32/bin/icpc`
`-L/home/cmplr/usr3/alrahate/compilers/ic10.1mainline/20070725/Linux32/lib`
`-I/home/cmplr/usr3/alrahate/compilers/ic10.1mainline/20070725/Linux32/include`

Fortran benchmarks (except as noted below):
```
ifort
```

437.leslie3d: `/home/cmplr/usr3/alrahate/compilers/ic10.1mainline/20070725/Linux32/bin/ifort`
`-L/home/cmplr/usr3/alrahate/compilers/ic10.1mainline/20070725/Linux32/lib`
`-I/home/cmplr/usr3/alrahate/compilers/ic10.1mainline/20070725/Linux32/include`

Benchmarks using both Fortran and C:
```
icc ifort
```

# 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 -nofor_main
   436.cactusADM: -DSPEC_CPU_LP64 -nofor_main
       444.namd: -DSPEC_CPU_LP64
      447.dealII: -DSPEC_CPU_LP64
     453.povray: -DSPEC_CPU_LP64
    454.calculix: -DSPEC_CPU_LP64 -nofor_main
    459.GemsFDTD: -DSPEC_CPU_LP64
       465.tonto: -DSPEC_CPU_LP64
        481.wrf: -DSPEC_CPU_LP64 -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LINUX
```

# Peak Optimization Flags

C benchmarks:

433.milc: `-prof-gen(pass 1) -prof-use(pass 2) -fast -fno-alias`
`-auto-ilp32`

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# Peak Optimization Flags (Continued)

470.lbm: `-prof-gen(pass 1) -prof-use(pass 2) -fast -unroll2 -scalar-rep- -prefetch -opt-malloc-options=3`

482.sphinx3: `-fast -unroll2`

C++ benchmarks:

444.namd: `-prof-gen(pass 1) -prof-use(pass 2) -fast -fno-alias -auto-ilp32`

447.dealII: `-prof-gen(pass 1) -prof-use(pass 2) -fast -unroll2 -ansi-alias -scalar-rep-`

450.soplex: `-prof-gen(pass 1) -prof-use(pass 2) -fast -opt-malloc-options=3`

453.povray: `-prof-gen(pass 1) -prof-use(pass 2) -fast -unroll4 -ansi-alias`

Fortran benchmarks:

410.bwaves: `-fast -prefetch`

416.gamess: `-prof-gen(pass 1) -prof-use(pass 2) -fast -unroll2 -Ob0 -ansi-alias -scalar-rep-`

434.zeusmp: `-prof-gen(pass 1) -prof-use(pass 2) -fast`

437.leslie3d: `-prof-gen(pass 1) -prof-use(pass 2) -fast -prefetch -opt-malloc-options=3`

459.GemsFDTD: `-prof-gen(pass 1) -prof-use(pass 2) -fast -unroll2 -Ob0 -prefetch`

465.tonto: `-prof-gen(pass 1) -prof-use(pass 2) -fast -unroll4 -auto`

Benchmarks using both Fortran and C:

435.gromacs: `-prof-gen(pass 1) -prof-use(pass 2) -fast -prefetch -auto-ilp32`

436.cactusADM: `-prof-gen(pass 1) -prof-use(pass 2) -fast -unroll2 -prefetch -parallel -auto-ilp32`

454.calculix: `-fast -unroll-aggressive -auto-ilp32`

481.wrf: `-fast -auto-ilp32`

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The flags file that was used to format this result can be browsed at
`http://www.spec.org/cpu2006/flags/HP-Intel-ic10.1-linux-fp-flags.20090714.02.html`

You can also download the XML flags source by saving the following link:
`http://www.spec.org/cpu2006/flags/HP-Intel-ic10.1-linux-fp-flags.20090714.02.xml`

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For other inquiries, please contact webmaster@spec.org.

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