# SPEC® CFP2006 Result

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## Lenovo Group Limited

(Test Sponsor: Intel Corporation)

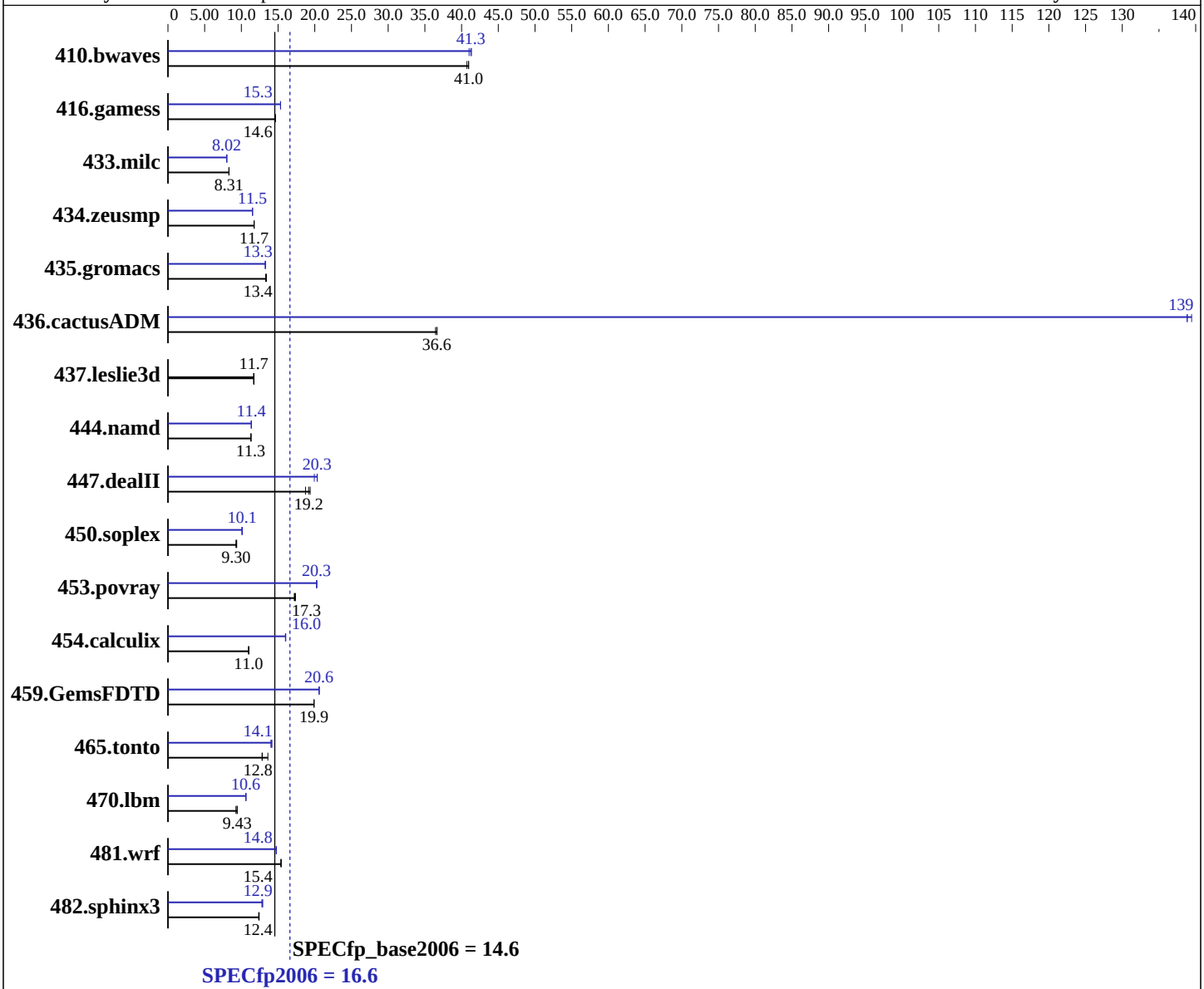
Lenovo R630 G7 (Intel Xeon processor E7320, 2.13 GHz)

SPECfp®2006 = 16.6

SPECfp_base2006 = 14.6

**CPU2006 license:** 13
**Test sponsor:** Intel Corporation
**Tested by:** Intel Corporation

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




## Hardware

| | |
|---|---|
| CPU Name: | Intel Xeon E7320 |
| CPU Characteristics: | Quad Core, 2.13 GHz |
| CPU MHz: | 2133 |
| FPU: | Integrated |
| CPU(s) enabled: | 16 cores, 4 chips, 4 cores/chip |
| CPU(s) orderable: | 1,2,4 chips |
| Primary Cache: | 32 KB I + 32 KB D on chip per core |
| Secondary Cache: | 4 MB I+D on chip per chip, 2 MB shared / 2 cores |

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## Software

| | |
|---|---|
| Operating System: | 64-Bit SUSE LINUX Enterprise Server 10 SP1 RC1, Kernel linux-cbgm 2.6.16.43-0.5-smp for x86_64 |
| Compiler: | Intel C++ and Fortran Compiler for Linux32 and Linux64 Version 10.1 Build 20070824 |
| Auto Parallel: | Yes |
| File System: | ReiserFS |
| System State: | Multi-user, run level 3 |

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L3 Cache: None
Other Cache: None
Memory: 16 GB (16 * 1GB Samsung PC2-5300F, 2 rank, CL5-5-5, ECC)
Disk Subsystem: Seagate, SAS, 73GB, 10Krpm, 1 disk only
Other Hardware: None

Base Pointers: 64-bit
Peak Pointers: 32/64-bit
Other Software: Binutils 2.17.50.0.15

## Results Table

| Benchmark | Base | | | | | | Peak | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 410.bwaves | 334 | 40.7 | 332 | 41.0 | **332** | **41.0** | 329 | 41.3 | **329** | **41.3** | 331 | 41.0 |
| 416.gamess | 1340 | 14.6 | 1341 | 14.6 | **1340** | **14.6** | **1276** | **15.3** | 1277 | 15.3 | 1276 | 15.3 |
| 433.milc | 1104 | 8.32 | **1104** | **8.31** | 1104 | 8.31 | 1146 | 8.01 | 1145 | 8.02 | **1145** | **8.02** |
| 434.zeusmp | 775 | 11.7 | **775** | **11.7** | 776 | 11.7 | 790 | 11.5 | **790** | **11.5** | 790 | 11.5 |
| 435.gromacs | 537 | 13.3 | 533 | 13.4 | **533** | **13.4** | 538 | 13.3 | 538 | 13.3 | **538** | **13.3** |
| 436.cactusADM | 328 | 36.4 | **326** | **36.6** | 326 | 36.7 | **86.1** | **139** | 85.7 | 139 | 86.1 | 139 |
| 437.leslie3d | 802 | 11.7 | **802** | **11.7** | 806 | 11.7 | 802 | 11.7 | **802** | **11.7** | 806 | 11.7 |
| 444.namd | **710** | **11.3** | 710 | 11.3 | 708 | 11.3 | **706** | **11.4** | 706 | 11.4 | 707 | 11.3 |
| 447.dealII | 611 | 18.7 | **597** | **19.2** | 590 | 19.4 | **563** | **20.3** | 574 | 19.9 | 562 | 20.4 |
| 450.soplex | 890 | 9.37 | **896** | **9.30** | 899 | 9.27 | **826** | **10.1** | 828 | 10.1 | 824 | 10.1 |
| 453.povray | **308** | **17.3** | 309 | 17.2 | 306 | 17.4 | 262 | 20.3 | **263** | **20.3** | 263 | 20.2 |
| 454.calculix | 749 | 11.0 | **751** | **11.0** | 752 | 11.0 | 514 | 16.0 | 516 | 16.0 | **515** | **16.0** |
| 459.GemsFDTD | **533** | **19.9** | 533 | 19.9 | 533 | 19.9 | 514 | 20.6 | **516** | **20.6** | 516 | 20.6 |
| 465.tonto | 723 | 13.6 | **766** | **12.8** | 767 | 12.8 | **696** | **14.1** | 695 | 14.2 | 702 | 14.0 |
| 470.lbm | 1484 | 9.26 | 1457 | 9.43 | **1458** | **9.43** | 1293 | 10.6 | 1294 | 10.6 | **1293** | **10.6** |
| 481.wrf | 725 | 15.4 | 725 | 15.4 | **725** | **15.4** | **757** | **14.8** | 756 | 14.8 | 757 | 14.8 |
| 482.sphinx3 | **1572** | **12.4** | 1568 | 12.4 | 1577 | 12.4 | 1511 | 12.9 | 1523 | 12.8 | **1512** | **12.9** |

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

## General Notes

```
Bios settings:
Hardware Prefetcher:      Enabled
Adjacent Sector Prefetch: Enabled
All benchmarks compiled in 64-bit mode except
450.soplex, 470.lbm and 482.sphinx3, for peak, are
compiled in 32-bit mode
```

## Base Compiler Invocation

C benchmarks:
icc

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## Base Compiler Invocation (Continued)

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 -parallel

C++ benchmarks:
-fast -parallel

Fortran benchmarks:
-fast -parallel

Benchmarks using both Fortran and C:
-fast -parallel

## Peak Compiler Invocation

C benchmarks (except as noted below):
```
/home/cmplr/usr3/alrahate/compilers/ic10.1mainline/20070824/Linux32/bin/icc
-L/home/cmplr/usr3/alrahate/compilers/ic10.1mainline/20070824/Linux32/lib
-I/home/cmplr/usr3/alrahate/compilers/ic10.1mainline/20070824/Linux32/include
```

433.milc: `icc`

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

450.soplex: `/home/cmplr/usr3/alrahate/compilers/ic10.1mainline/20070824/Linux32/bin/icpc -L/home/cmplr/usr3/alrahate/compilers/ic10.1mainline/20070824/Linux32/lib -I/home/cmplr/usr3/alrahate/compilers/ic10.1mainline/20070824/Linux32/include`

Fortran benchmarks:
```
ifort
```

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`
437.leslie3d: `-DSPEC_CPU_LP64`
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`

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

Continued on next page

## Peak Optimization Flags (Continued)

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 -parallel`

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: `basepeak = yes`

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

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 -parallel -prefetch -auto-ilp32`

The flags file that was used to format this result can be browsed at
`http://www.spec.org/cpu2006/flags/Intel-ic10.1-FP-intel64-linux-flags.20090714.33.html`

You can also download the XML flags source by saving the following link:
`http://www.spec.org/cpu2006/flags/Intel-ic10.1-FP-intel64-linux-flags.20090714.33.xml`

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Tested with SPEC CPU2006 v1.0.
Report generated on Tue Jul 22 12:37:58 2014 by SPEC CPU2006 PS/PDF formatter v6932.
Originally published on 18 September 2007.