SPEC® CFP2006 Result
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Lenovo Group Limited

Lenovo ThinkServer RD220 (Intel Xeon X5570, 2.93 GHz)

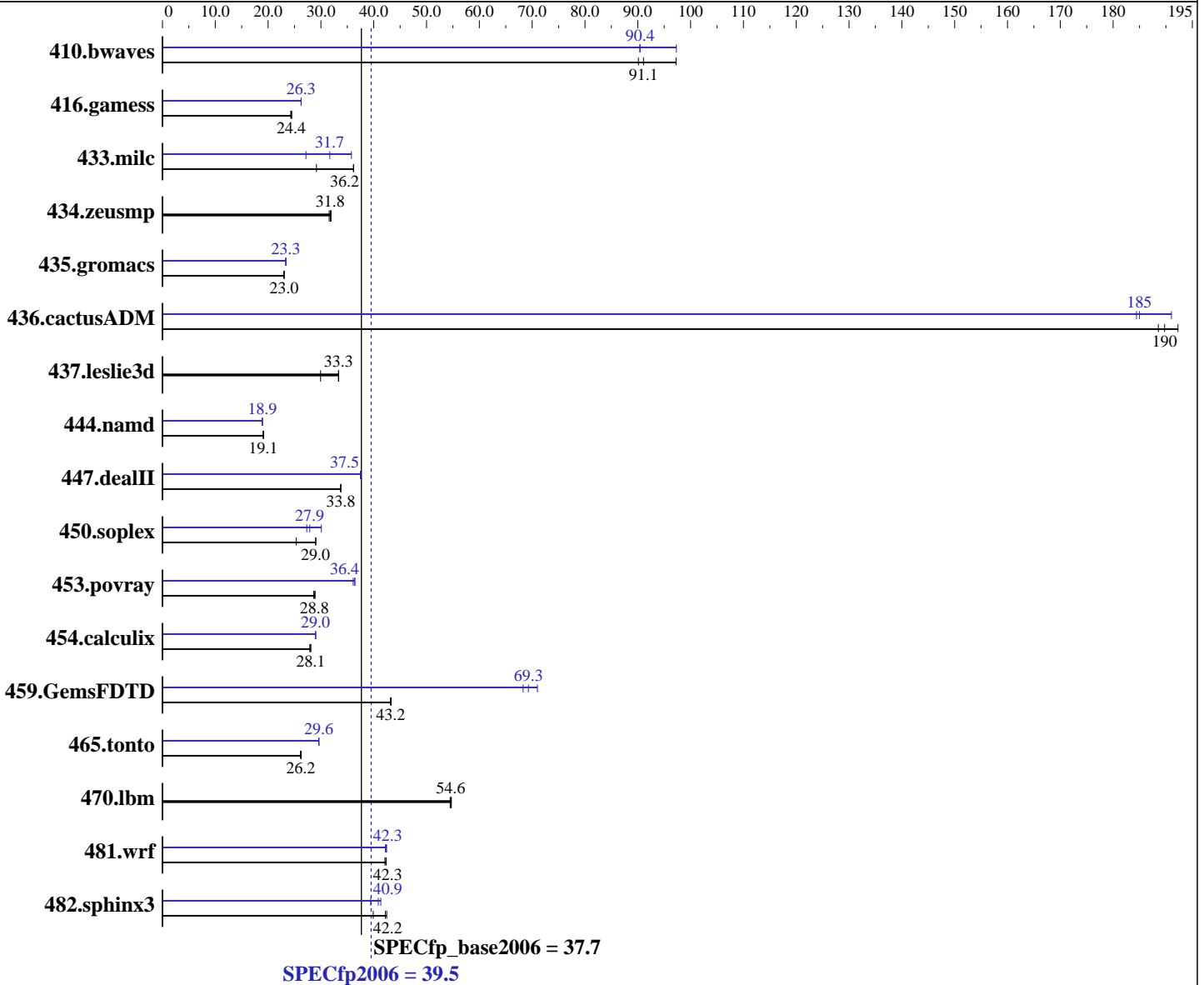$SPECfp^{®}2006 =$ 39.5

$SPECfp\_base2006 =$ 37.7

CPU2006 license: 9017	**Test date:** May-2009
Test sponsor: Lenovo Group Limited	**Hardware Availability:** May-2009
Tested by: Lenovo Group Limited	**Software Availability:** Feb-2009

Benchmark results bar chart (scale 0 to 195):

- **410.bwaves** — 90.4 / 91.1
- **416.gamess** — 26.3 / 24.4
- **433.milc** — 31.7 / 36.2
- **434.zeusmp** — 31.8
- **435.gromacs** — 23.3 / 23.0
- **436.cactusADM** — 185 / 190
- **437.leslie3d** — 33.3
- **444.namd** — 18.9 / 19.1
- **447.dealII** — 37.5 / 33.8
- **450.soplex** — 27.9 / 29.0
- **453.povray** — 36.4 / 28.8
- **454.calculix** — 29.0 / 28.1
- **459.GemsFDTD** — 69.3 / 43.2
- **465.tonto** — 29.6 / 26.2
- **470.lbm** — 54.6
- **481.wrf** — 42.3 / 42.3
- **482.sphinx3** — 40.9 / 42.2

SPECfp_base2006 = 37.7

SPECfp2006 = 39.5

Hardware

CPU Name:	Intel Xeon X5570
CPU Characteristics:	Intel Turbo Boost Technology up to 3.33 GHz
CPU MHz:	2933
FPU:	Integrated
CPU(s) enabled:	8 cores, 2 chips, 4 cores/chip
CPU(s) orderable:	1,2 chips
Primary Cache:	32 KB I + 32 KB D on chip per core
Secondary Cache:	256 KB I+D on chip per core

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Software

Operating System:	SuSE Linux Enterprise Server 10 (x86_64) SP2, Kernel 2.6.16.60-0.21-smp
Compiler:	Intel C++ and Fortran Compiler 11.0 for Linux Build 20090131 Package ID: l_cproc_p_11.0.081, l_cprof_p_11.0.081
Auto Parallel:	Yes
File System:	ReiserFS
System State:	Run level 3 (multi-user)
Base Pointers:	64-bit

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L3 Cache:	8 MB I+D on chip per chip	Peak Pointers:	32/64-bit
Other Cache:	None	Other Software:	Binutils 2.18.50.0.7.20080502
Memory:	24 GB (6 x 4 GB DDR3-1333 DR RDIMM)		
Disk Subsystem:	1 x 73 GB, SAS 15K RPM		
Other Hardware:	None		

Results Table

Benchmark	Base						Peak					
	Seconds	**Ratio**	**Seconds**	**Ratio**	**Seconds**	**Ratio**	**Seconds**	**Ratio**	**Seconds**	**Ratio**	**Seconds**	**Ratio**
410.bwaves	140	97.2	151	90.1	**149**	**91.1**	150	90.4	**150**	**90.4**	140	97.3
416.gamess	**803**	**24.4**	806	24.3	800	24.5	745	26.3	**746**	**26.3**	746	26.3
433.milc	**254**	**36.2**	254	36.2	315	29.2	257	35.8	**290**	**31.7**	338	27.2
434.zeusmp	285	31.9	**286**	**31.8**	288	31.6	285	31.9	**286**	**31.8**	288	31.6
435.gromacs	310	23.0	310	23.0	**310**	**23.0**	**306**	**23.3**	306	23.3	305	23.4
436.cactusADM	63.4	189	62.1	192	**63.0**	**190**	62.5	191	64.8	184	**64.6**	**185**
437.leslie3d	282	33.3	314	29.9	**282**	**33.3**	282	33.3	314	29.9	**282**	**33.3**
444.namd	421	19.1	**420**	**19.1**	419	19.1	424	18.9	**424**	**18.9**	424	18.9
447.dealII	339	33.8	**339**	**33.8**	339	33.8	305	37.5	305	37.5	**305**	**37.5**
450.soplex	330	25.3	**288**	**29.0**	287	29.0	277	30.1	**299**	**27.9**	305	27.3
453.povray	184	28.9	186	28.7	**185**	**28.8**	147	36.1	146	36.4	**146**	**36.4**
454.calculix	296	27.9	294	28.1	**294**	**28.1**	**284**	**29.0**	285	29.0	284	29.0
459.GemsFDTD	245	43.3	246	43.2	**246**	**43.2**	149	71.0	**153**	**69.3**	155	68.3
465.tonto	374	26.3	376	26.2	**376**	**26.2**	**332**	**29.6**	332	29.6	333	29.6
470.lbm	251	54.7	252	54.5	**252**	**54.6**	251	54.7	252	54.5	**252**	**54.6**
481.wrf	**264**	**42.3**	264	42.3	265	42.1	**264**	**42.3**	265	42.2	263	42.4
482.sphinx3	459	42.5	**462**	**42.2**	488	39.9	**477**	**40.9**	494	39.4	471	41.3

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 prior to run

Platform Notes

    BIOS configuration:
    Hyper-Threading Technology = Disabled

General Notes

    OMP_NUM_THREADS set to number of cores
    KMP_AFFINITY set to granularity=fine,scatter
    KMP_STACKSIZE set to 200M

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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:
        -xSSE4.2 -ipo -O3 -no-prec-div -static -parallel -opt-prefetch

C++ benchmarks:
        -xSSE4.2 -ipo -O3 -no-prec-div -static -parallel -opt-prefetch

Fortran benchmarks:
        -xSSE4.2 -ipo -O3 -no-prec-div -static -parallel -opt-prefetch

Benchmarks using both Fortran and C:
        -xSSE4.2 -ipo -O3 -no-prec-div -static -parallel -opt-prefetch

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Peak Compiler Invocation

C benchmarks (except as noted below):
    icc

    482.sphinx3: `icc -m32`

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

      450.soplex: `icpc -m32`

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`
             470.lbm: `-DSPEC_CPU_LP64`
               481.wrf: `-DSPEC_CPU_LP64 -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LINUX`

Peak Optimization Flags

C benchmarks:

        433.milc: `-xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)`
                `-no-prec-div(pass 2) -static(pass 2) -prof-use(pass 2)`
                `-fno-alias`

        470.lbm: basepeak = yes

        482.sphinx3: `-xSSE4.2 -ipo -O3 -no-prec-div -static -unroll2`

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Peak Optimization Flags (Continued)

C++ benchmarks:

445.namd: -xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -static(pass 2) -prof-use(pass 2)
-fno-alias -auto-ilp32

447.dealII: -xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -static(pass 2) -prof-use(pass 2)
-unroll2 -ansi-alias -scalar-rep- -opt-prefetch

450.soplex: -xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -static(pass 2) -prof-use(pass 2)
-opt-malloc-options=3

453.povray: -xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -static(pass 2) -prof-use(pass 2)
-unroll4 -ansi-alias

Fortran benchmarks:

410.bwaves: -xSSE4.2 -ipo -O3 -no-prec-div -static -opt-prefetch
-parallel

416.gamess: -xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -static(pass 2) -prof-use(pass 2)
-unroll2 -Ob0 -ansi-alias -scalar-rep-

434.zeusmp: basepeak = yes

437.leslie3d: basepeak = yes

459.GemsFDTD: -xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -static(pass 2) -prof-use(pass 2)
-unroll2 -Ob0 -opt-prefetch -parallel

465.tonto: -xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -static(pass 2) -prof-use(pass 2)
-unroll4 -auto

Benchmarks using both Fortran and C:

435.gromacs: -xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -static(pass 2) -prof-use(pass 2)
-opt-prefetch -auto-ilp32

436.cactusADM: -xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -static(pass 2) -prof-use(pass 2)
-unroll2 -opt-prefetch -parallel -auto-ilp32

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Peak Optimization Flags (Continued)

454.calculix: `-xSSE4.2 -ipo -O3 -no-prec-div -static -auto-ilp32`

481.wrf: `-xSSE4.2 -ipo -O3 -no-prec-div -static -opt-prefetch -parallel -auto-ilp32`

The flags file that was used to format this result can be browsed at
http://www.spec.org/cpu2006/flags/Intel-ic11.0-fp-linux64-revA.20090716.html

You can also download the XML flags source by saving the following link:
http://www.spec.org/cpu2006/flags/Intel-ic11.0-fp-linux64-revA.20090716.xml

For questions about this result, please contact the tester.
For other inquiries, please contact webmaster@spec.org.

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