SPEC® CFP2006 Result
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Lenovo Group Limited
IBM Flex System x440

$SPECfp®\_rate2006 =$ 1230
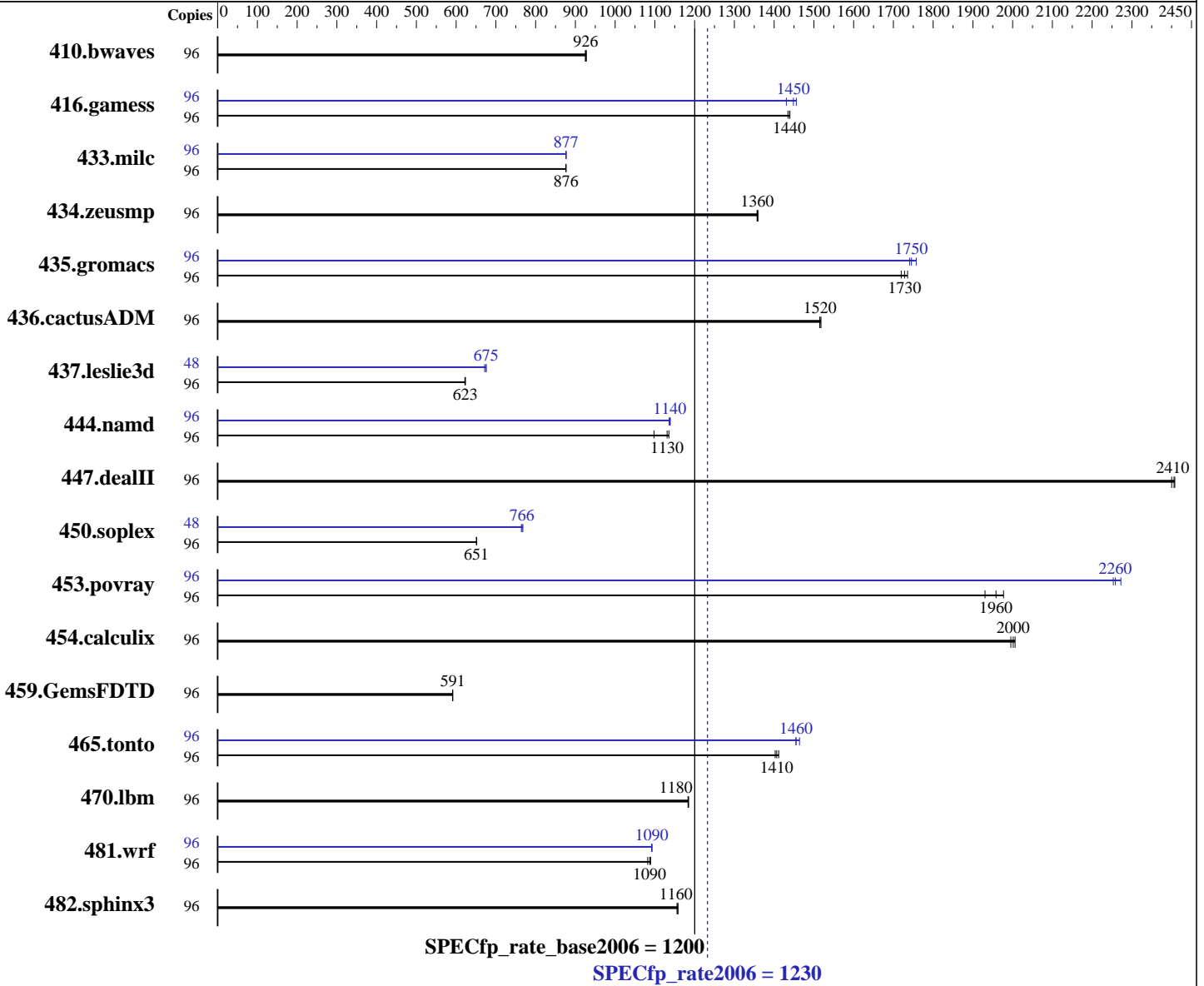
$SPECfp\_rate\_base2006 =$ 1200

CPU2006 license: 9017
Test sponsor: Lenovo Group Limited
Tested by: Lenovo Group Limited

Test date: Nov-2014
Hardware Availability: Dec-2014
Software Availability: Nov-2013

Copies

Benchmark	Copies	Result
410.bwaves	96	926
416.gamess	96 / 96	1450 / 1440
433.milc	96 / 96	877 / 876
434.zeusmp	96	1360
435.gromacs	96 / 96	1750 / 1730
436.cactusADM	96	1520
437.leslie3d	48 / 96	675 / 623
444.namd	96 / 96	1140 / 1130
447.dealII	96	2410
450.soplex	48 / 96	766 / 651
453.povray	96 / 96	2260 / 1960
454.calculix	96	2000
459.GemsFDTD	96	591
465.tonto	96 / 96	1460 / 1410
470.lbm	96	1180
481.wrf	96 / 96	1090 / 1090
482.sphinx3	96	1160

SPECfp_rate_base2006 = 1200

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Hardware

CPU Name:	Intel Xeon E5-4657L v2
CPU Characteristics:	Intel Turbo Boost Technology up to 2.90 GHz
CPU MHz:	2400
FPU:	Integrated
CPU(s) enabled:	48 cores, 4 chips, 12 cores/chip, 2 threads/core
CPU(s) orderable:	4 chips
Primary Cache:	32 KB I + 32 KB D on chip per core
Secondary Cache:	256 KB I+D on chip per core

Continued on next page

Software

Operating System:	Red Hat Enterprise Linux Server release 6.5 (Santiago) 2.6.32-431.el6.x86_64
Compiler:	C/C++: Version 14.0.0.080 of Intel C++ Studio XE for Linux; Fortran: Version 14.0.0.080 of Intel Fortran Studio XE for Linux
Auto Parallel:	No
File System:	ext4

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L3 Cache:	30 MB I+D on chip per chip
Other Cache:	None
Memory:	512 GB (32 x 16 GB 2Rx4 PC3-14900R-13, ECC, running at 1600 MHz)
Disk Subsystem:	1 x 300 GB SATA
Other Hardware:	None
System State:	Run level 3 (multi-user)
Base Pointers:	32/64-bit
Peak Pointers:	32/64-bit
Other Software:	None

Results Table

Benchmark	Copies	Base Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Peak Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	96	**1408**	**926**	1411	925	1406	928	96	**1408**	**926**	1411	925	1406	928
416.gamess	96	**1306**	**1440**	1306	1440	1310	1430	96	1291	1460	**1298**	**1450**	1314	1430
433.milc	96	1006	876	1006	876	**1006**	**876**	96	**1005**	**877**	1006	876	1005	877
434.zeusmp	96	**644**	**1360**	644	1360	643	1360	96	**644**	**1360**	644	1360	643	1360
435.gromacs	96	395	1740	399	1720	**397**	**1730**	96	**393**	**1750**	390	1760	394	1740
436.cactusADM	96	756	1520	757	1510	**757**	**1520**	96	756	1520	757	1510	**757**	**1520**
437.leslie3d	96	**1449**	**623**	1451	622	1448	623	48	672	672	**668**	**675**	668	675
444.namd	96	678	1140	**681**	**1130**	701	1100	96	**677**	**1140**	676	1140	678	1140
447.dealII	96	458	2400	**456**	**2410**	456	2410	96	458	2400	**456**	**2410**	456	2410
450.soplex	96	1228	652	**1229**	**651**	1230	651	48	**523**	**766**	521	768	524	764
453.povray	96	265	1930	258	1980	**261**	**1960**	96	**226**	**2260**	225	2270	227	2250
454.calculix	96	**396**	**2000**	397	2000	395	2010	96	**396**	**2000**	397	2000	395	2010
459.GemsFDTD	96	1722	591	**1723**	**591**	1724	591	96	1722	591	**1723**	**591**	1724	591
465.tonto	96	673	1400	669	1410	**672**	**1410**	96	**649**	**1460**	649	1450	645	1460
470.lbm	96	1113	1180	**1114**	**1180**	1115	1180	96	1113	1180	**1114**	**1180**	1115	1180
481.wrf	96	991	1080	984	1090	**986**	**1090**	96	982	1090	**982**	**1090**	981	1090
482.sphinx3	96	**1616**	**1160**	1619	1160	1616	1160	96	**1616**	**1160**	1619	1160	1616	1160

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

Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl commands to bind each copy to a specific processor. For details, please see the config file.

Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"

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Platform Notes

```
Operating Mode set to Maximum Perfomance in BIOS
Sysinfo program /cpu2006.1.2/config/sysinfo.rev6818
$Rev: 6818 $ $Date:: 2012-07-17 #$ e86d102572650a6e4d596a3cee98f191
running on CongoIVB Fri Nov 14 20:40:39 2014

This section contains SUT (System Under Test) info as seen by
some common utilities.  To remove or add to this section, see:
  http://www.spec.org/cpu2006/Docs/config.html#sysinfo

From /proc/cpuinfo
   model name : Intel(R) Xeon(R) CPU E5-4657L v2 @ 2.40GHz
      4 "physical id"s (chips)
      96 "processors"
   cores, siblings (Caution: counting these is hw and system dependent.  The
   following excerpts from /proc/cpuinfo might not be reliable.  Use with
   caution.)
      cpu cores : 12
      siblings  : 24
      physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 13
      physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 13
      physical 2: cores 0 1 2 3 4 5 8 9 10 11 12 13
      physical 3: cores 0 1 2 3 4 5 8 9 10 11 12 13
   cache size : 30720 KB

From /proc/meminfo
   MemTotal:       529403280 kB
   HugePages_Total:        0
   Hugepagesize:        2048 kB

/usr/bin/lsb_release -d
   Red Hat Enterprise Linux Server release 6.5 Beta (Santiago)

From /etc/*release* /etc/*version*
   redhat-release: Red Hat Enterprise Linux Server release 6.5 Beta (Santiago)
   system-release: Red Hat Enterprise Linux Server release 6.5 Beta (Santiago)
   system-release-cpe: cpe:/o:redhat:enterprise_linux:6server:beta:server

uname -a:
   Linux CongoIVB 2.6.32-424.el6.x86_64 #1 SMP Mon Oct 14 20:11:50 EDT 2013
   x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Nov 14 07:14 last=5

SPEC is set to: /cpu2006.1.2
   Filesystem                      Type  Size  Used Avail Use% Mounted on
   /dev/mapper/vg_congoivb-lv_root ext4  265G   12G  240G   5% /

Additional information from dmidecode:
  BIOS IBM -[CGE101AUS-1.00]- 09/18/2014
  Memory:
   31x Micron 36JSF2G72PZ-1G9E1 16 GB 1600 MHz 2 rank
   16x Not Specified Not Specified
```

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Lenovo Group Limited	SPECfp_rate2006 =	1230
IBM Flex System x440	SPECfp_rate_base2006 =	1200

CPU2006 license: 9017		**Test date:**	Nov-2014
Test sponsor: Lenovo Group Limited		**Hardware Availability:**	Dec-2014
Tested by: Lenovo Group Limited		**Software Availability:**	Nov-2013

Platform Notes (Continued)

```
    1x Samsung M393B2G70QH0-CMA 16 GB 1600 MHz 2 rank

  (End of data from sysinfo program)
```

General Notes

```
Environment variables set by runspec before the start of the run:
LD_LIBRARY_PATH = "/cpu2006.1.2/libs/32:/cpu2006.1.2/libs/64:/cpu2006.1.2/sh"

 Binaries compiled on a system with 1x Core i7-860 CPU + 8GB
 memory using RedHat EL 6.4
 Transparent Huge Pages enabled with:
 echo always > /sys/kernel/mm/redhat_transparent_hugepage/enabled
 Filesystem page cache cleared with:
 echo 1>        /proc/sys/vm/drop_caches
 runspec command invoked through numactl i.e.:
 numactl --interleave=all runspec <etc>
```

Base Compiler Invocation

C benchmarks:
```
     icc    -m64
```

C++ benchmarks:
```
     icpc   -m64
```

Fortran benchmarks:
```
     ifort -m64
```

Benchmarks using both Fortran and C:
```
     icc    -m64 ifort -m64
```

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
```

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Base Portability Flags (Continued)

```
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:
```
-xAVX -ipo -O3 -no-prec-div -opt-prefetch -auto-p32 -ansi-alias
-opt-mem-layout-trans=3
```

C++ benchmarks:
```
-xAVX -ipo -O3 -no-prec-div -opt-prefetch -auto-p32 -ansi-alias
-opt-mem-layout-trans=3
```

Fortran benchmarks:
```
-xAVX -ipo -O3 -no-prec-div -opt-prefetch
```

Benchmarks using both Fortran and C:
```
-xAVX -ipo -O3 -no-prec-div -opt-prefetch -auto-p32 -ansi-alias
-opt-mem-layout-trans=3
```

Peak Compiler Invocation

C benchmarks:
```
icc   -m64
```

C++ benchmarks (except as noted below):
```
icpc  -m64
```

```
  450.soplex: icpc -m32
```

Fortran benchmarks:
```
ifort -m64
```

Benchmarks using both Fortran and C:
```
icc   -m64 ifort -m64
```

Peak Portability Flags

```
410.bwaves: -DSPEC_CPU_LP64
416.gamess: -DSPEC_CPU_LP64
```

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Lenovo Group Limited IBM Flex System x440	SPECfp_rate2006 = 1230
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CPU2006 license: 9017
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Peak Portability Flags (Continued)

```
      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
    482.sphinx3: -DSPEC_CPU_LP64
```

Peak Optimization Flags

C benchmarks:

```
      433.milc: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
                -no-prec-div(pass 2) -opt-mem-layout-trans=3(pass 2)
                -prof-use(pass 2) -auto-ilp32

      470.lbm: basepeak = yes

    482.sphinx3: basepeak = yes
```

C++ benchmarks:

```
      444.namd: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
                -no-prec-div(pass 2) -opt-mem-layout-trans=3(pass 2)
                -prof-use(pass 2) -fno-alias -auto-ilp32

     447.dealII: basepeak = yes

    450.soplex: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
                -no-prec-div(pass 2) -opt-mem-layout-trans=3(pass 2)
                -prof-use(pass 2) -opt-malloc-options=3

    453.povray: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
                -no-prec-div(pass 2) -opt-mem-layout-trans=3(pass 2)
                -prof-use(pass 2) -unroll4 -ansi-alias
```

Fortran benchmarks:

```
    410.bwaves: basepeak = yes
```

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Peak Optimization Flags (Continued)

416.gamess: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -prof-use(pass 2) -unroll2
-inline-level=0 -scalar-rep-

434.zeusmp: basepeak = yes

437.leslie3d: -xAVX -ipo -O3 -no-prec-div -opt-prefetch

459.GemsFDTD: basepeak = yes

465.tonto: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -prof-use(pass 2) -unroll4 -auto
-inline-calloc -opt-malloc-options=3

Benchmarks using both Fortran and C:

435.gromacs: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -opt-mem-layout-trans=3(pass 2)
-prof-use(pass 2) -opt-prefetch -auto-ilp32

436.cactusADM: basepeak = yes

454.calculix: basepeak = yes

481.wrf: -xAVX -ipo -O3 -no-prec-div -auto-ilp32

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2006/flags/Intel-ic14.0-official-linux64.20140128.html
http://www.spec.org/cpu2006/flags/IBM-Platform-Flags-V1.2-IVB-C.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/Intel-ic14.0-official-linux64.20140128.xml
http://www.spec.org/cpu2006/flags/IBM-Platform-Flags-V1.2-IVB-C.xml

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

Tested with SPEC CPU2006 v1.2.
Report generated on Wed Dec 3 10:33:44 2014 by SPEC CPU2006 PS/PDF formatter v6932.
Originally published on 2 December 2014.