SPEC® CFP2006 Result
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Lenovo Group Limited

$SPECfp^{®}\_rate2006 = \quad 156$

$SPECfp\_rate\_base2006 = \quad 152$

Lenovo System x3100 M5
(Intel Xeon E3-1270 v3, 3.90 GHz)

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

Test date: Sep-2015
Hardware Availability: May-2014
Software Availability: Jun-2014

Copies		
410.bwaves	8	111
416.gamess	8 / 8	199 / 191
433.milc	8	111
434.zeusmp	8	172
435.gromacs	8 / 8	243 / 236
436.cactusADM	8	171
437.leslie3d	8	70.7
444.namd	8 / 8	162 / 160
447.dealII	8	300
450.soplex	4 / 8	93.9 / 81.0
453.povray	8 / 8	317 / 268
454.calculix	8	295
459.GemsFDTD	8	69.7
465.tonto	8 / 8	179 / 173
470.lbm	8	135
481.wrf	8	135
482.sphinx3	8	152

SPECfp_rate_base2006 = 152

SPECfp_rate2006 = 156

Hardware

CPU Name: Intel Xeon E3-1270 v3
CPU Characteristics: Intel Turbo Boost Technology up to 3.90 GHz
CPU MHz: 3500
FPU: Integrated
CPU(s) enabled: 4 cores, 1 chip, 4 cores/chip, 2 threads/core
CPU(s) orderable: 1 chip
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 7.1 (Maipo)
3.10.0-229.el7.x86_64
Compiler: C/C++: Version 16.0.0.0 of Intel C++ Studio XE for Linux;
Fortran: Version 16.0.0.0 of Intel Fortran Studio XE for Linux
Auto Parallel: No
File System: xfs

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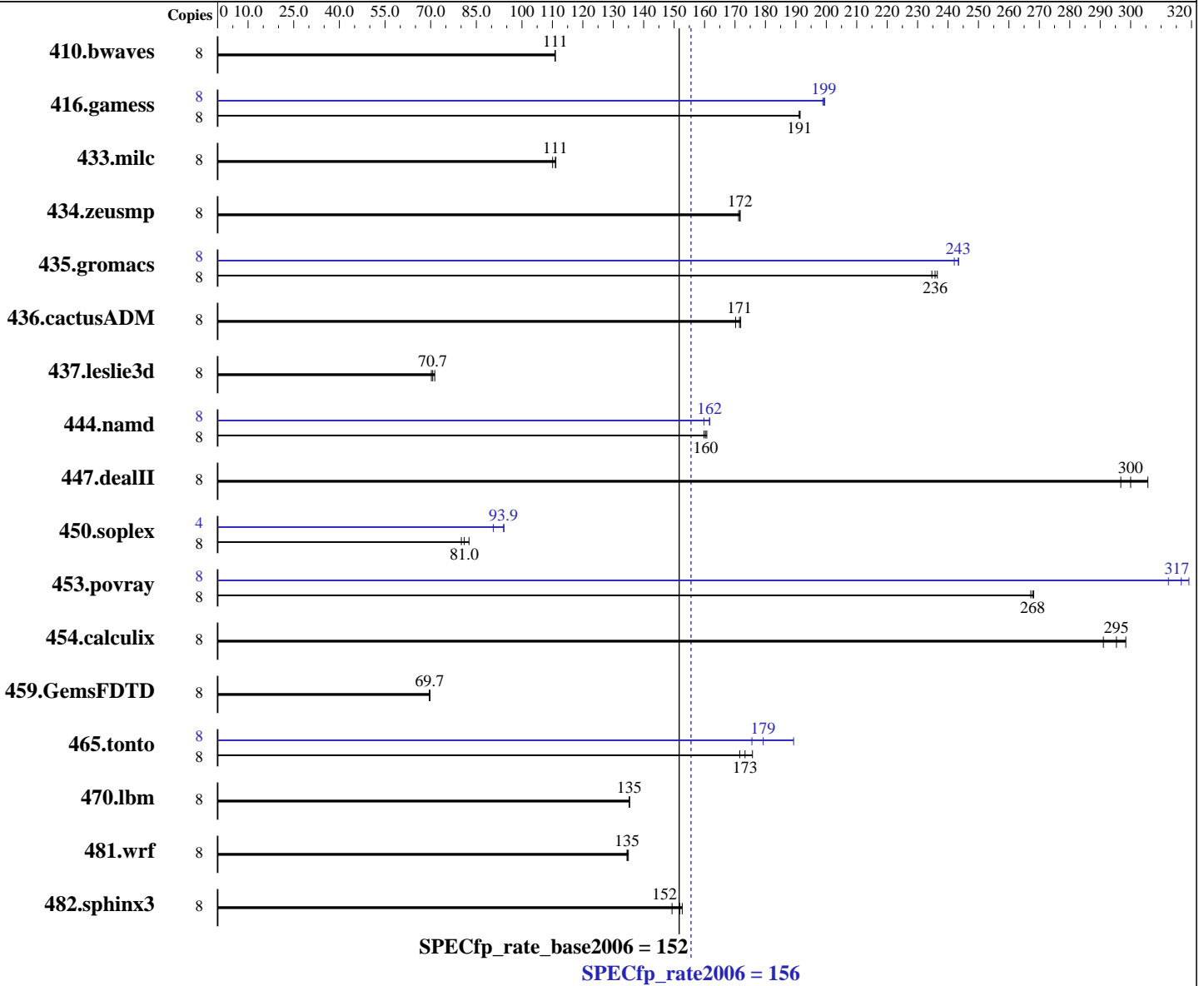|	
CPU2006 license: 9017	**Test date:** Sep-2015
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L3 Cache:	8 MB I+D on chip per chip	System State:	Run level 3 (multi-user)
Other Cache:	None	Base Pointers:	32/64-bit
Memory:	16 GB (4 x 4 GB 2Rx8 PC3L-12800E-11, ECC)	Peak Pointers:	32/64-bit
Disk Subsystem:	1 x 500 GB SATA, 7200 RPM	Other Software:	None
Other Hardware:	None		

Results Table

Benchmark	Base Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Peak Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	8	981	111	**980**	**111**	980	111	8	981	111	**980**	**111**	980	111
416.gamess	8	820	191	818	191	**819**	**191**	8	**786**	**199**	788	199	785	199
433.milc	8	661	111	**662**	**111**	667	110	8	661	111	**662**	**111**	667	110
434.zeusmp	8	**424**	**172**	425	171	424	172	8	**424**	**172**	425	171	424	172
435.gromacs	8	242	236	**242**	**236**	243	235	8	235	244	236	242	**235**	**243**
436.cactusADM	8	562	170	**557**	**171**	556	172	8	562	170	**557**	**171**	556	172
437.leslie3d	8	1071	70.2	1054	71.3	**1064**	**70.7**	8	1071	70.2	1054	71.3	**1064**	**70.7**
444.namd	8	399	161	401	160	**400**	**160**	8	397	162	**397**	**162**	402	160
447.dealII	8	299	306	308	297	**305**	**300**	8	299	306	308	297	**305**	**300**
450.soplex	8	833	80.1	808	82.6	**823**	**81.0**	4	**355**	**93.9**	355	94.1	368	90.6
453.povray	8	**159**	**268**	159	267	159	268	8	**134**	**317**	133	319	136	312
454.calculix	8	227	291	**223**	**295**	221	298	8	227	291	**223**	**295**	221	298
459.GemsFDTD	8	1220	69.6	1216	69.8	**1218**	**69.7**	8	1220	69.6	1216	69.8	**1218**	**69.7**
465.tonto	8	448	176	**454**	**173**	459	172	8	448	176	416	189	**439**	**179**
470.lbm	8	**812**	**135**	812	135	812	135	8	**812**	**135**	812	135	812	135
481.wrf	8	664	135	**664**	**135**	662	135	8	664	135	**664**	**135**	662	135
482.sphinx3	8	1044	149	1021	153	**1027**	**152**	8	1044	149	1021	153	**1027**	**152**

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

Submit Notes

The taskset mechanism was used to bind copies to processors. The config file option 'submit' was used to generate taskset 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"

Platform Notes

BIOS setting:
Operating Mode set to "Efficiency-Favor Performance"
Sysinfo program /root/cpu2006_ic16/config/sysinfo.rev6914

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CPU2006 license: 9017

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Test date: Sep-2015

Hardware Availability: May-2014

Software Availability: Jun-2014

Platform Notes (Continued)

```
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
running on x3100m5.labs.lenovo.com Sat Sep  5 20:13:26 2015

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 E3-1270 v3 @ 3.50GHz
      1 "physical id"s (chips)
      8 "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 : 4
      siblings  : 8
      physical 0: cores 0 1 2 3
   cache size : 8192 KB

From /proc/meminfo
   MemTotal:       16100780 kB
   HugePages_Total:       0
   Hugepagesize:       2048 kB

From /etc/*release* /etc/*version*
   os-release:
      NAME="Red Hat Enterprise Linux Server"
      VERSION="7.1 (Maipo)"
      ID="rhel"
      ID_LIKE="fedora"
      VERSION_ID="7.1"
      PRETTY_NAME="Red Hat Enterprise Linux Server 7.1 (Maipo)"
      ANSI_COLOR="0;31"
      CPE_NAME="cpe:/o:redhat:enterprise_linux:7.1:GA:server"
   redhat-release: Red Hat Enterprise Linux Server release 7.1 (Maipo)
   system-release: Red Hat Enterprise Linux Server release 7.1 (Maipo)
   system-release-cpe: cpe:/o:redhat:enterprise_linux:7.1:ga:server

uname -a:
   Linux x3100m5.labs.lenovo.com 3.10.0-229.el7.x86_64 #1 SMP Thu Jan 29
   18:37:38 EST 2015 x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Sep 5 09:02

SPEC is set to: /root/cpu2006_ic16
   Filesystem             Type  Size  Used Avail Use% Mounted on
   /dev/mapper/rhel-root xfs    50G   41G  9.2G  82% /
Additional information from dmidecode:

   Warning: Use caution when you interpret this section. The 'dmidecode' program
   reads system data which is "intended to allow hardware to be accurately
   determined", but the intent may not be met, as there are frequent changes to
```

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Platform Notes (Continued)

```
    hardware, firmware, and the "DMTF SMBIOS" standard.

    BIOS IBM -[J9E113LUS-1.05]- 07/06/2014
    Memory:
    4x Hynix/Hyundai HMT351U7EFR8A-PB 4 GB 2 rank 1600 MHz

  (End of data from sysinfo program)
```

General Notes

```
Environment variables set by runspec before the start of the run:
LD_LIBRARY_PATH = "/root/cpu2006_ic16/libs/32:/root/cpu2006_ic16/libs/64:/root/cpu2006_ic16/sh"

  Binaries compiled on a system with 1x Intel Core i5-4670K CPU + 32GB
  memory using RedHat EL 7.1
  Transparent Huge Pages enabled with:
  echo always > /sys/kernel/mm/transparent_hugepage/enabled
```

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:
```
-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32
-ansi-alias
```

C++ benchmarks:
```
-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32
-ansi-alias
```

Fortran benchmarks:
```
-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch
```

Benchmarks using both Fortran and C:
```
-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32
-ansi-alias
```

Peak Compiler Invocation

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

C++ benchmarks (except as noted below):
```
icpc   -m64
```
```
 450.soplex: icpc -m32 -L/opt/intel/compilers_and_libraries_2016/linux/compiler/lib/ia32_lin
```

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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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
     450.soplex: -D_FILE_OFFSET_BITS=64
    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: basepeak = yes

       470.lbm: basepeak = yes

    482.sphinx3: basepeak = yes
```

C++ benchmarks:

```
      444.namd: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)
                -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)
                -par-num-threads=1(pass 1) -prof-use(pass 2) -fno-alias
                -auto-ilp32

     447.dealII: basepeak = yes

     450.soplex: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)
                -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)
                -par-num-threads=1(pass 1) -prof-use(pass 2)
                -opt-malloc-options=3

    453.povray: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)
                -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)
                -par-num-threads=1(pass 1) -prof-use(pass 2) -unroll4
                -ansi-alias
```

Fortran benchmarks:

Continued on next page

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Peak Optimization Flags (Continued)

410.bwaves: basepeak = yes

416.gamess: `-xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)`
`-ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)`
`-par-num-threads=1(pass 1) -prof-use(pass 2) -unroll2`
`-inline-level=0 -scalar-rep-`

434.zeusmp: basepeak = yes

437.leslie3d: basepeak = yes

459.GemsFDTD: basepeak = yes

465.tonto: `-xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)`
`-ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)`
`-par-num-threads=1(pass 1) -prof-use(pass 2) -unroll4 -auto`
`-inline-calloc -opt-malloc-options=3`

Benchmarks using both Fortran and C:

435.gromacs: `-xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)`
`-ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)`
`-par-num-threads=1(pass 1) -prof-use(pass 2) -opt-prefetch`
`-auto-ilp32`

436.cactusADM: basepeak = yes

454.calculix: basepeak = yes

481.wrf: basepeak = yes

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2006/flags/Intel-ic16.0-official-linux64.html
http://www.spec.org/cpu2006/flags/Lenovo-Platform-Flags-V1.2-HSW-B.20150923.html

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You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/Intel-ic16.0-official-linux64.xml
http://www.spec.org/cpu2006/flags/Lenovo-Platform-Flags-V1.2-HSW-B.20150923.xml

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

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