SPEC® CFP2006 Result

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Lenovo Group Limited

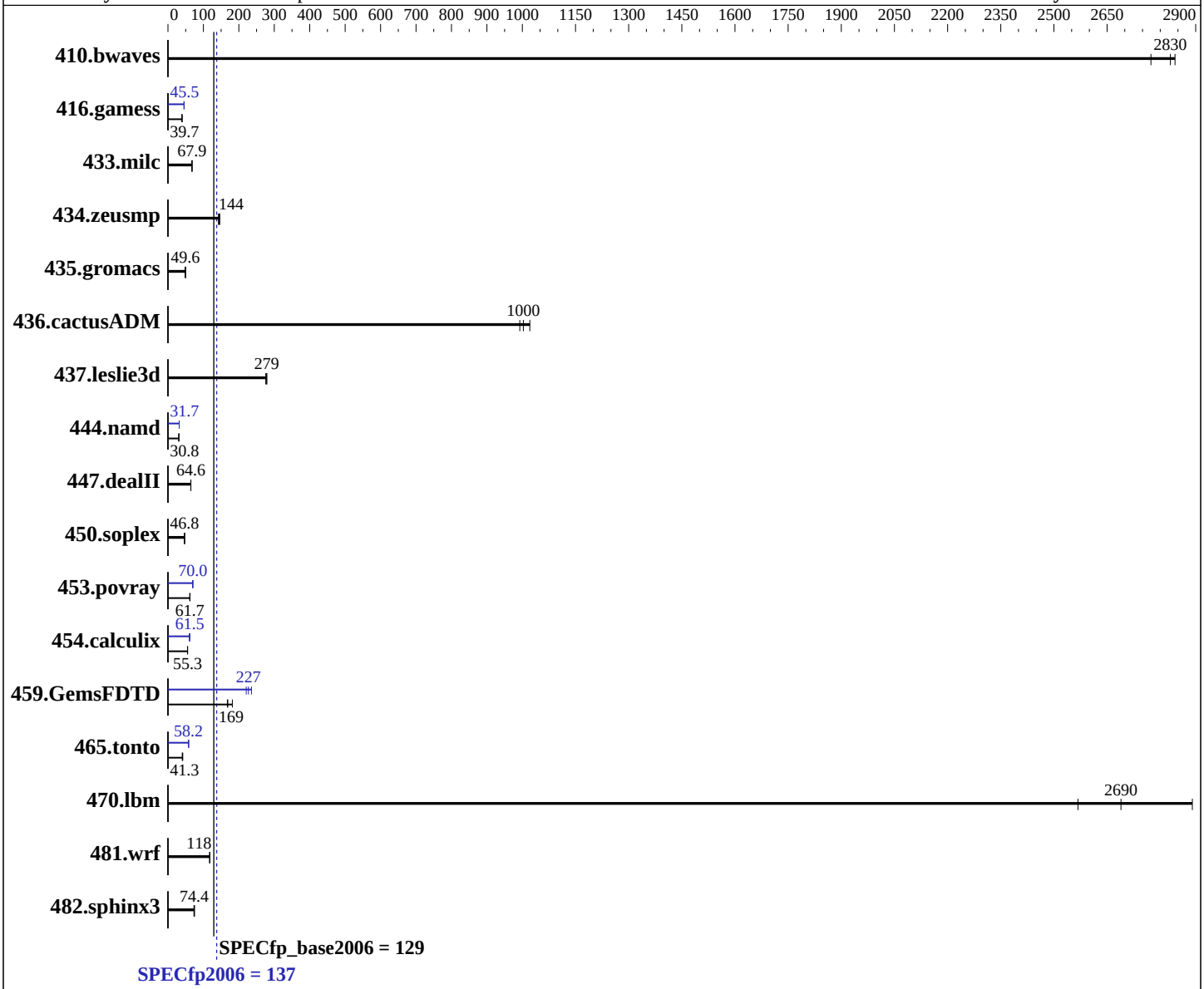
Lenovo System x3950 X6
(Intel Xeon E7-8891 v4, 2.80 GHz)

SPECfp®2006 = 137

SPECfp_base2006 = 129

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

Test date: Aug-2016
Hardware Availability: Jun-2016
Software Availability: Dec-2015



Hardware

CPU Name:	Intel Xeon E7-8891 v4
CPU Characteristics:	Intel Turbo Boost Technology up to 3.50 GHz
CPU MHz:	2800
FPU:	Integrated
CPU(s) enabled:	80 cores, 8 chips, 10 cores/chip
CPU(s) orderable:	4,8 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 12 SP1 (x86_64) Kernel 3.12.49-11-default
Compiler:	C/C++: Version 16.0.0.101 of Intel C++ Studio XE for Linux; Fortran: Version 16.0.0.101 of Intel Fortran Studio XE for Linux
Auto Parallel:	Yes
File System:	xfs
System State:	Run level 3 (multi-user)

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L3 Cache: 60 MB I+D on chip per chip
Other Cache: None
Memory: 1 TB (64 x 16 GB 2Rx4 PC4-2133P-R, running at 1600 MHz)
Disk Subsystem: 1 x 800 GB SATA SSD
Other Hardware: None

Base Pointers: 64-bit
Peak Pointers: 32/64-bit
Other Software: None

Results Table

Benchmark	Base						Peak					
	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	4.78	2840	**4.80**	**2830**	4.90	2770	4.78	2840	**4.80**	**2830**	4.90	2770
416.gamess	491	39.9	**493**	**39.7**	496	39.5	430	45.5	**431**	**45.5**	431	45.4
433.milc	135	67.9	135	67.9	**135**	**67.9**	135	67.9	135	67.9	**135**	**67.9**
434.zeusmp	62.2	146	**63.1**	**144**	63.9	142	62.2	146	**63.1**	**144**	63.9	142
435.gromacs	**144**	**49.6**	147	48.5	144	49.6	**144**	**49.6**	147	48.5	144	49.6
436.cactusADM	**11.9**	**1000**	11.7	1020	12.0	993	**11.9**	**1000**	11.7	1020	12.0	993
437.leslie3d	33.7	279	**33.7**	**279**	34.1	276	33.7	279	**33.7**	**279**	34.1	276
444.namd	261	30.8	**261**	**30.8**	261	30.7	**253**	**31.7**	253	31.7	253	31.7
447.dealII	**177**	**64.6**	177	64.7	177	64.5	**177**	**64.6**	177	64.7	177	64.5
450.soplex	**178**	**46.8**	178	46.8	178	46.9	**178**	**46.8**	178	46.8	178	46.9
453.povray	86.2	61.7	**86.2**	**61.7**	85.4	62.3	**76.0**	**70.0**	75.5	70.4	76.4	69.6
454.calculix	149	55.4	**149**	**55.3**	149	55.2	136	60.5	134	61.5	**134**	**61.5**
459.GemsFDTD	**62.8**	**169**	63.3	168	58.4	182	**46.7**	**227**	48.0	221	45.0	236
465.tonto	245	40.2	**238**	**41.3**	236	41.6	169	58.1	**169**	**58.2**	169	58.2
470.lbm	4.75	2890	5.35	2570	**5.11**	**2690**	4.75	2890	5.35	2570	**5.11**	**2690**
481.wrf	94.9	118	94.5	118	**94.8**	**118**	94.9	118	94.5	118	**94.8**	**118**
482.sphinx3	261	74.8	**262**	**74.4**	266	73.4	261	74.8	**262**	**74.4**	266	73.4

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

Operating System Notes

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

Platform Notes

```
BIOS Configuration:
 Operating Mode set to "Maximum Performance"
 Hyper-Threading set to Disable
Sysinfo program /home/cpu2006-1.2-ic16.0/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
running on X3950-01-SLES12SP1 Mon Aug  1 21:23:25 2016

This section contains SUT (System Under Test) info as seen by
some common utilities.  To remove or add to this section, see:
```

Continued on next page

Platform Notes (Continued)

```
      http://www.spec.org/cpu2006/Docs/config.html#sysinfo

    From /proc/cpuinfo
       model name : Intel(R) Xeon(R) CPU E7-8891 v4 @ 2.80GHz
          8 "physical id"s (chips)
          80 "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 : 10
          siblings  : 10
          physical 0: cores 5 9 10 11 13 18 24 26 28 29
          physical 1: cores 5 9 10 11 13 18 24 26 28 29
          physical 2: cores 5 9 10 11 13 18 24 26 28 29
          physical 3: cores 5 9 10 11 13 18 24 26 28 29
          physical 4: cores 5 9 10 11 13 18 24 26 28 29
          physical 5: cores 5 9 10 11 13 18 24 26 28 29
          physical 6: cores 5 9 10 11 13 18 24 26 28 29
          physical 7: cores 5 9 10 11 13 18 24 26 28 29
       cache size : 61440 KB

    From /proc/meminfo
       MemTotal:       1058561676 kB
       HugePages_Total:       0
       Hugepagesize:       2048 kB

    From /etc/*release* /etc/*version*
       SuSE-release:
          SUSE Linux Enterprise Server 12 (x86_64)
          VERSION = 12
          PATCHLEVEL = 1
          # This file is deprecated and will be removed in a future service pack or
          release.
          # Please check /etc/os-release for details about this release.
       os-release:
          NAME="SLES"
          VERSION="12-SP1"
          VERSION_ID="12.1"
          PRETTY_NAME="SUSE Linux Enterprise Server 12 SP1"
          ID="sles"
          ANSI_COLOR="0;32"
          CPE_NAME="cpe:/o:suse:sles:12:sp1"

    uname -a:
       Linux X3950-01-SLES12SP1 3.12.49-11-default #1 SMP Wed Nov 11 20:52:43 UTC
       2015 (8d714a0) x86_64 x86_64 x86_64 GNU/Linux

    run-level 3 Aug 1 16:32

    SPEC is set to: /home/cpu2006-1.2-ic16.0
       Filesystem     Type  Size  Used Avail Use% Mounted on
       /dev/sda4      xfs   512G  6.9G  505G   2% /home
```

Continued on next page

Platform Notes (Continued)

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

   BIOS IBM -[A9E135CUS-3.10]- 06/16/2016
   Memory:
    128x NO DIMM Unknown
    64x Samsung M393A2G40DB0-CPB 16 GB 2 rank 2133 MHz, configured at 1600 MHz

 (End of data from sysinfo program)
```

General Notes

```
 Environment variables set by runspec before the start of the run:
 KMP_AFFINITY = "granularity=fine,compact"
 LD_LIBRARY_PATH = "/home/cpu2006-1.2-ic16.0/libs/32:/home/cpu2006-1.2-ic16.0/libs/64:/home/cpu2006-1.2-ic16.0/sh"
 OMP_NUM_THREADS = "80"

  Binaries compiled on a system with 1x Intel Core i5-4670K CPU + 32GB
  memory using RedHat EL 7.1
  Transparent Huge Pages disabled with:
  echo never > /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

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Base Portability Flags (Continued)

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:
-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -opt-prefetch -ansi-alias

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

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

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

Peak Compiler Invocation

C benchmarks:
icc -m64

C++ benchmarks:
icpc -m64

Fortran benchmarks:
ifort -m64

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

Peak Portability Flags

Same as Base Portability Flags

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: basepeak = yes

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:

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: -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 -opt-prefetch -parallel

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) -inline-calloc

Continued on next page

Peak Optimization Flags (Continued)

465.tonto (continued):
`-opt-malloc-options=3 -auto -unroll4`

Benchmarks using both Fortran and C:

435.gromacs: `basepeak = yes`

436.cactusADM: `basepeak = yes`

454.calculix: `-xCORE-AVX2 -ipo -O3 -no-prec-div -auto-ilp32 -ansi-alias`

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-BDW-B.html`

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-BDW-B.xml`

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