SPEC® CFP2006 Result
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Lenovo Group Limited

Lenovo System x3950 X6
(2.40 GHz, Intel Xeon E7-8867 v4)

$SPECfp^{®}2006 =$ 123

$SPECfp\_base2006 =$ 116

Benchmark	Result
410.bwaves	1280
416.gamess	43.0 / 35.1
433.milc	64.2
434.zeusmp	143
435.gromacs	40.0
436.cactusADM	1000
437.leslie3d	227
444.namd	29.9 / 29.0
447.dealII	61.4
450.soplex	44.7
453.povray	66.0 / 58.6
454.calculix	57.3 / 50.3
459.GemsFDTD	155 / 135
465.tonto	55.0 / 33.9
470.lbm	4520
481.wrf	110
482.sphinx3	59.9

SPECfp_base2006 = 116

SPECfp2006 = 123

Hardware

CPU Name: Intel Xeon E7-8867 v4
CPU Characteristics: Intel Turbo Boost Technology up to 3.30 GHz
CPU MHz: 2400
FPU: Integrated
CPU(s) enabled: 144 cores, 8 chips, 18 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
Continued on next page

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)
Continued on next page

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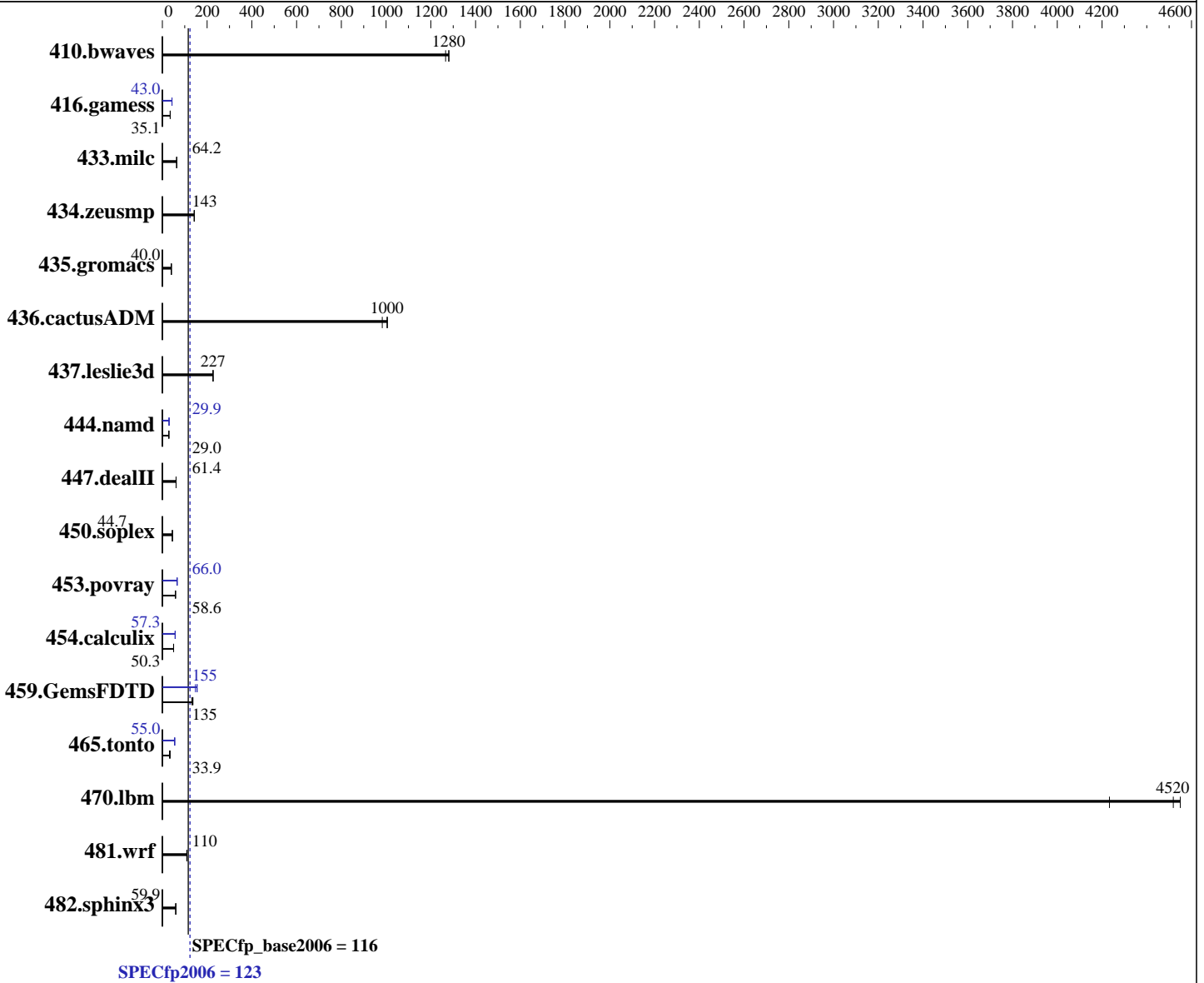|	
CPU2006 license: 9017	**Test date:** Jul-2016
Test sponsor: Lenovo Group Limited	**Hardware Availability:** Jun-2016
Tested by: Lenovo Group Limited	**Software Availability:** Dec-2015

L3 Cache:	45 MB I+D on chip per chip	Base Pointers:	64-bit
Other Cache:	None	Peak Pointers:	32/64-bit
Memory:	1 TB (64 x 16 GB 2Rx4 PC4-2133P-R, running at 1600 MHz)	Other Software:	None
Disk Subsystem:	2 x 600 GB 15000 RPM SAS, RAID 1		
Other Hardware:	None		

Results Table

Benchmark	Base						Peak					
	Seconds	**Ratio**	**Seconds**	**Ratio**	**Seconds**	**Ratio**	**Seconds**	**Ratio**	**Seconds**	**Ratio**	**Seconds**	**Ratio**
410.bwaves	10.6	1280	**10.6**	**1280**	10.7	1270	10.6	1280	**10.6**	**1280**	10.7	1270
416.gamess	556	35.2	560	35.0	**557**	**35.1**	**456**	**43.0**	456	43.0	455	43.0
433.milc	**143**	**64.2**	144	63.8	143	64.3	**143**	**64.2**	144	63.8	143	64.3
434.zeusmp	63.6	143	**63.7**	**143**	64.2	142	63.6	143	**63.7**	**143**	64.2	142
435.gromacs	**178**	**40.0**	179	40.0	177	40.3	**178**	**40.0**	179	40.0	177	40.3
436.cactusADM	**11.9**	**1000**	11.9	1010	12.2	983	**11.9**	**1000**	11.9	1010	12.2	983
437.leslie3d	41.4	227	**41.5**	**227**	41.5	226	41.4	227	**41.5**	**227**	41.5	226
444.namd	**276**	**29.0**	277	29.0	276	29.0	268	29.9	268	29.9	**268**	**29.9**
447.dealII	187	61.2	**186**	**61.4**	186	61.4	187	61.2	**186**	**61.4**	186	61.4
450.soplex	**186**	**44.7**	187	44.7	186	44.9	**186**	**44.7**	187	44.7	186	44.9
453.povray	**90.8**	**58.6**	90.8	58.6	90.4	58.8	**80.6**	**66.0**	80.8	65.8	80.6	66.0
454.calculix	164	50.3	165	50.0	**164**	**50.3**	144	57.3	**144**	**57.3**	144	57.2
459.GemsFDTD	77.6	137	**78.4**	**135**	80.6	132	68.3	155	**68.4**	**155**	72.0	147
465.tonto	**290**	**33.9**	309	31.9	285	34.6	178	55.2	**179**	**55.0**	179	54.9
470.lbm	3.25	4230	**3.04**	**4520**	3.02	4550	3.25	4230	**3.04**	**4520**	3.02	4550
481.wrf	102	109	**102**	**110**	101	110	102	109	**102**	**110**	101	110
482.sphinx3	326	59.8	**326**	**59.9**	322	60.5	326	59.8	**326**	**59.9**	322	60.5

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 Jul 11 19:18:46 2016

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

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Hardware Availability: Jun-2016
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Platform Notes (Continued)

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

 From /proc/cpuinfo
    model name : Intel(R) Xeon(R) CPU E7-8867 v4 @ 2.40GHz
       8 "physical id"s (chips)
       144 "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 : 18
       siblings  : 18
       physical 0: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
       physical 1: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
       physical 2: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
       physical 3: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
       physical 4: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
       physical 5: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
       physical 6: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
       physical 7: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
    cache size : 46080 KB

 From /proc/meminfo
    MemTotal:       1058555020 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 Jul 11 14:11

 SPEC is set to: /home/cpu2006-1.2-ic16.0
    Filesystem      Type   Size  Used Avail Use% Mounted on
    /dev/sda4       xfs    512G  6.6G  506G   2% /home
```
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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 = "144"

  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
```

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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

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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

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

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