SPEC® CFP2006 Result
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Lenovo Global Technology

ThinkSystem SD530
(2.10 GHz, Intel Xeon Platinum 8176)

$SPECfp^{®}2006 =$ 151

$SPECfp\_base2006 =$ 144

CPU2006 license: 9017

Test sponsor: Lenovo Global Technology

Tested by: Lenovo Global Technology

Test date: Jun-2017

Hardware Availability: Aug-2017

Software Availability: Apr-2017

Benchmark results chart (scale 0 to 1700):

- **410.bwaves** 1110
- **416.gamess** 52.6 / 49.2
- **433.milc** 78.1
- **434.zeusmp** 260
- **435.gromacs** 46.1
- **436.cactusADM** 1420
- **437.leslie3d** 481
- **444.namd** 37.4 / 36.5
- **447.dealII** 73.8
- **450.soplex** 54.6
- **453.povray** 81.6 / 71.7
- **454.calculix** 77.7 / 72.2
- **459.GemsFDTD** 301 / 251
- **465.tonto** 68.6 / 46.7
- **470.lbm** 1690
- **481.wrf** 138
- **482.sphinx3** 64.0

SPECfp_base2006 = 144

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Hardware

CPU Name:	Intel Xeon Platinum 8176
CPU Characteristics:	Intel Turbo Boost Technology up to 3.80 GHz
CPU MHz:	2100
FPU:	Integrated
CPU(s) enabled:	56 cores, 2 chips, 28 cores/chip
CPU(s) orderable:	1,2 chips
Primary Cache:	32 KB I + 32 KB D on chip per core
Secondary Cache:	1 MB I+D on chip per core

Continued on next page

Software

Operating System:	SUSE Linux Enterprise Server 12 SP2 (x86_64) Kernel 4.4.21-69-default
Compiler:	C/C++: Version 17.0.3.191 of Intel C/C++ Compiler for Linux; Fortran: Version 17.0.3.191 of Intel Fortran Compiler for Linux
Auto Parallel:	Yes
File System:	xfs
System State:	Run level 3 (multi-user)

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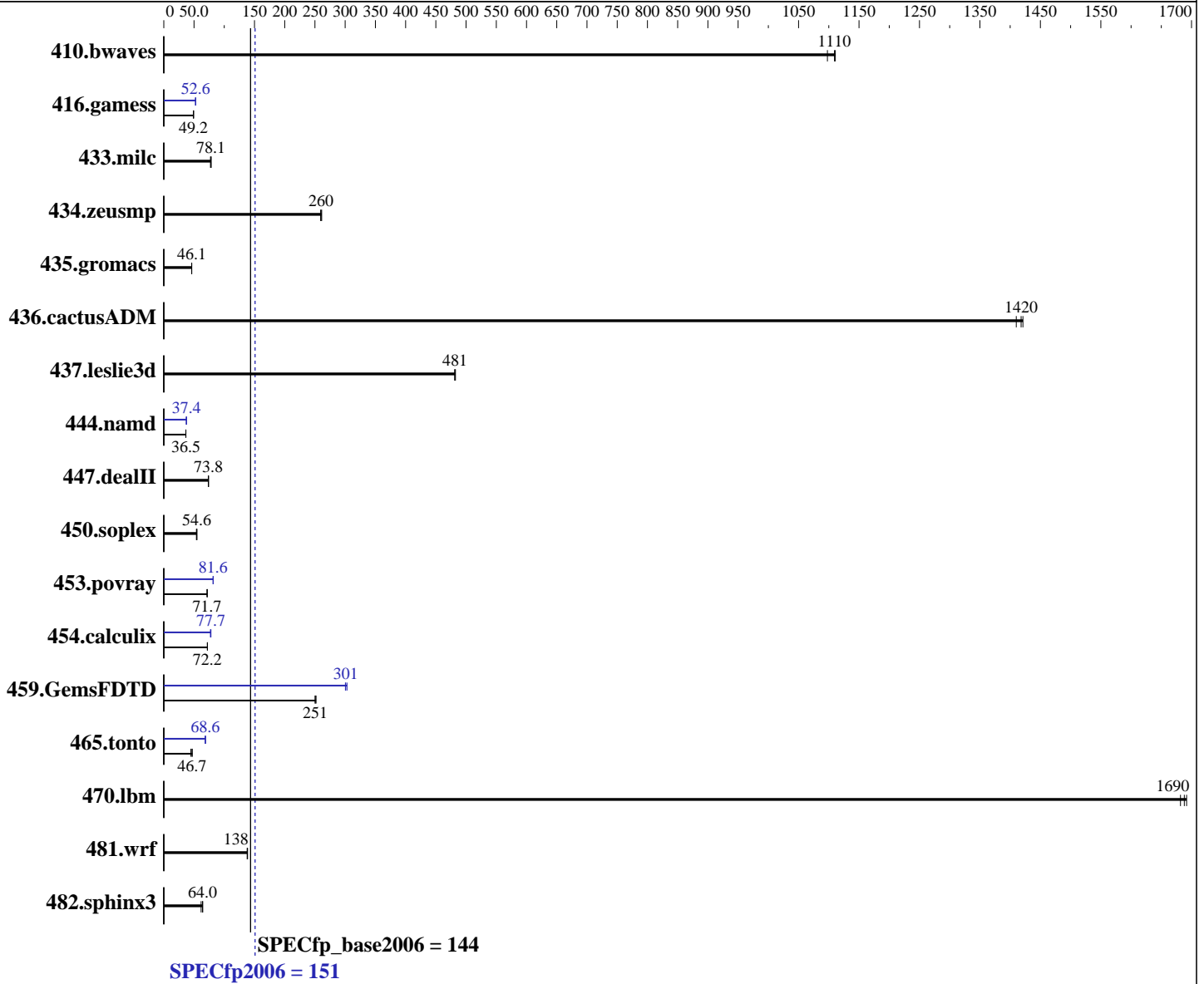|	
CPU2006 license: 9017	**Test date:** Jun-2017
Test sponsor: Lenovo Global Technology	**Hardware Availability:** Aug-2017
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L3 Cache:	38.5 MB I+D on chip per chip	Base Pointers:	64-bit
Other Cache:	None	Peak Pointers:	32/64-bit
Memory:	384 GB (12 x 32 GB 2Rx4 PC4-2666V-R)	Other Software:	None
Disk Subsystem:	1 x 800 GB SATA SSD		
Other Hardware:	None		

Results Table

Benchmark	Base						Peak					
	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	**12.3**	**1110**	12.4	1100	12.2	1110	**12.3**	**1110**	12.4	1100	12.2	1110
416.gamess	398	49.2	399	49.1	**398**	**49.2**	**372**	**52.6**	373	52.5	372	52.7
433.milc	**118**	**78.1**	119	77.2	117	78.2	**118**	**78.1**	119	77.2	117	78.2
434.zeusmp	35.1	259	34.8	261	**35.0**	**260**	35.1	259	34.8	261	**35.0**	**260**
435.gromacs	155	46.1	**155**	**46.1**	155	46.2	155	46.1	**155**	**46.1**	155	46.2
436.cactusADM	8.47	1410	8.41	1420	**8.43**	**1420**	8.47	1410	8.41	1420	**8.43**	**1420**
437.leslie3d	19.5	482	19.5	481	**19.5**	**481**	19.5	482	19.5	481	**19.5**	**481**
444.namd	220	36.5	220	36.5	**220**	**36.5**	**215**	**37.4**	214	37.4	215	37.4
447.dealII	155	73.7	**155**	**73.8**	155	74.0	155	73.7	**155**	**73.8**	155	74.0
450.soplex	**153**	**54.6**	152	54.7	155	53.9	**153**	**54.6**	152	54.7	155	53.9
453.povray	**74.2**	**71.7**	74.2	71.7	74.2	71.7	**65.2**	**81.6**	65.2	81.5	65.0	81.8
454.calculix	114	72.2	**114**	**72.2**	115	72.0	106	78.0	**106**	**77.7**	107	77.1
459.GemsFDTD	**42.4**	**251**	42.1	252	42.4	250	35.0	303	**35.3**	**301**	35.3	300
465.tonto	220	44.8	**211**	**46.7**	209	47.1	**143**	**68.6**	142	69.1	144	68.6
470.lbm	**8.14**	**1690**	8.12	1690	8.17	1680	**8.14**	**1690**	8.12	1690	8.17	1680
481.wrf	80.6	139	81.0	138	**80.9**	**138**	80.6	139	81.0	138	**80.9**	**138**
482.sphinx3	316	61.7	**304**	**64.0**	303	64.4	316	61.7	**304**	**64.0**	303	64.4

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:
         Choose Operating Mode set to Maximum Performance
         Hyper-Threading set to Disable
         LLC dead line alloc set to Disable
         Patrol Scrub set to Disable
         DCU Streamer Prefetcher set to Disable
         DCA set to Enable
         Sysinfo program /home/cpu2006-1.2-ic17.0u3/config/sysinfo.rev6993
         Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
         running on Stark-node-02 Tue Jun 13 13:52:39 2017

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Platform Notes (Continued)

```
   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) Platinum 8176 CPU @ 2.10GHz
         2 "physical id"s (chips)
         56 "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 : 28
         siblings  : 28
         physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24
         25 26 27 28 29 30
         physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24
         25 26 27 28 29 30
      cache size : 39424 KB

   From /proc/meminfo
      MemTotal:       395738148 kB
      HugePages_Total:        0
      Hugepagesize:        2048 kB

   From /etc/*release* /etc/*version*
      SuSE-release:
         SUSE Linux Enterprise Server 12 (x86_64)
         VERSION = 12
         PATCHLEVEL = 2
         # 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-SP2"
         VERSION_ID="12.2"
         PRETTY_NAME="SUSE Linux Enterprise Server 12 SP2"
         ID="sles"
         ANSI_COLOR="0;32"
         CPE_NAME="cpe:/o:suse:sles:12:sp2"

   uname -a:
      Linux Stark-node-02 4.4.21-69-default #1 SMP Tue Oct 25 10:58:20 UTC 2016
      (9464f67) x86_64 x86_64 x86_64 GNU/Linux

   run-level 3 Jun 10 12:41

   SPEC is set to: /home/cpu2006-1.2-ic17.0u3
      Filesystem      Type  Size  Used Avail Use% Mounted on
      /dev/sda4       xfs   688G  184G  505G  27% /home
   Additional information from dmidecode:
```
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Platform Notes (Continued)

```
    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 Lenovo -[TEE105Z-1.00]- 04/27/2017
    Memory:
    4x NO DIMM NO DIMM
    12x Samsung M393A4K40BB2-CTD 32 GB 2 rank 2666 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-ic17.0u3/lib/ia32:/home/cpu2006-1.2-ic17.0u3/lib/intel64:/home/cpu2006-1.2-ic17.0u3/sh10.2"
OMP_NUM_THREADS = "56"

 Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM
 memory using Redhat Enterprise Linux 7.2
 Transparent Huge Pages enabled with:
 echo never > /sys/kernel/mm/transparent_hugepage/enabled
 Filesystem page cache cleared with:
 shell invocation of 'sync; echo 3 > /proc/sys/vm/drop_caches' prior to run
```

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
```

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Base Portability Flags (Continued)

```
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:
```
-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -qopt-prefetch
```

C++ benchmarks:
```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
```

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

Benchmarks using both Fortran and C:
```
-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -qopt-prefetch
```

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

     447.dealII: basepeak = yes

    450.soplex: basepeak = yes

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

Fortran benchmarks:

    410.bwaves: basepeak = yes

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

    434.zeusmp: basepeak = yes

    437.leslie3d: basepeak = yes

  459.GemsFDTD: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
           -par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
           -no-prec-div(pass 2) -unroll2 -inline-level=0
           -qopt-prefetch -parallel

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

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Peak Optimization Flags (Continued)

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

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-ic17.0-official-linux64-revF.html
http://www.spec.org/cpu2006/flags/Lenovo-Platform-Flags-V1.2-SKL-C.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/Intel-ic17.0-official-linux64-revF.xml
http://www.spec.org/cpu2006/flags/Lenovo-Platform-Flags-V1.2-SKL-C.xml

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

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