SPEC® CFP2006 Result
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Lenovo Global Technology

$SPECfp^{®}2006 =$ 147

ThinkSystem SD530
(2.00 GHz, Intel Xeon Platinum 8164)

$SPECfp\_base2006 =$ 139

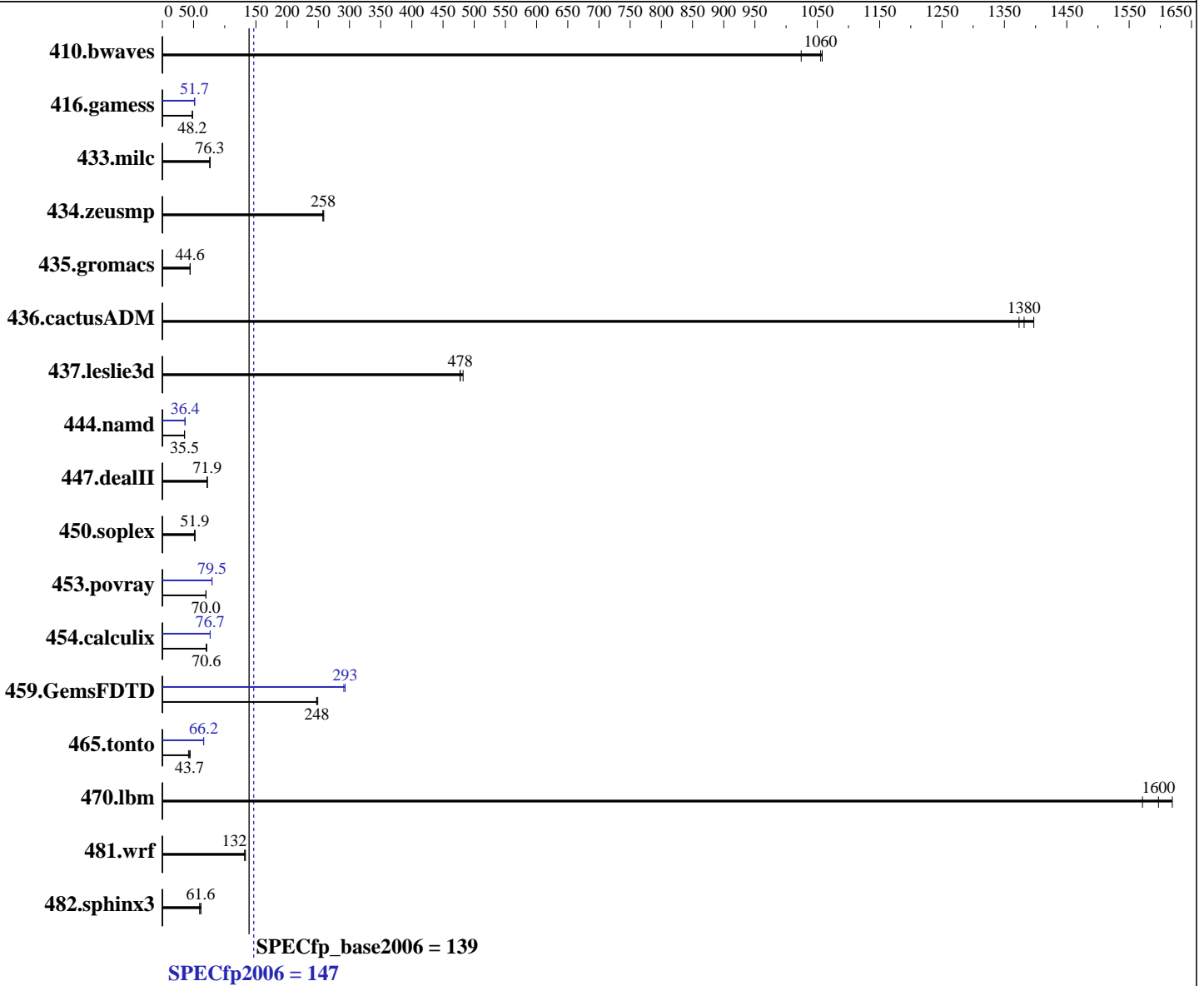**CPU2006 license:** 9017

Test sponsor: Lenovo Global Technology

Tested by: Lenovo Global Technology

Test date: Aug-2017

Hardware Availability: Aug-2017

Software Availability: Apr-2017

SPECfp_base2006 = 139

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Hardware

CPU Name: Intel Xeon Platinum 8164

CPU Characteristics: Intel Turbo Boost Technology up to 3.70 GHz

CPU MHz: 2000

FPU: Integrated

CPU(s) enabled: 52 cores, 2 chips, 26 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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L3 Cache:	35.75 MB I+D on chip per chip
Other Cache:	None
Memory:	384 GB (12 x 32 GB 2Rx4 PC4-2666V-R)
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	13.3	1020	**12.9**	**1060**	12.8	1060	13.3	1020	**12.9**	**1060**	12.8	1060
416.gamess	406	48.2	407	48.2	**406**	**48.2**	379	51.6	**379**	**51.7**	379	51.7
433.milc	**120**	**76.3**	121	76.0	120	76.5	**120**	**76.3**	121	76.0	120	76.5
434.zeusmp	35.4	257	35.2	259	**35.3**	**258**	35.4	257	35.2	259	**35.3**	**258**
435.gromacs	160	44.6	**160**	**44.6**	160	44.5	160	44.6	**160**	**44.6**	160	44.5
436.cactusADM	**8.65**	**1380**	8.70	1370	8.55	1400	**8.65**	**1380**	8.70	1370	8.55	1400
437.leslie3d	**19.7**	**478**	19.5	482	19.7	477	**19.7**	**478**	19.5	482	19.7	477
444.namd	226	35.5	**226**	**35.5**	226	35.5	**220**	**36.4**	220	36.5	220	36.4
447.dealII	159	72.1	**159**	**71.9**	159	71.7	159	72.1	**159**	**71.9**	159	71.7
450.soplex	159	52.3	161	51.7	**161**	**51.9**	159	52.3	161	51.7	**161**	**51.9**
453.povray	76.2	69.8	75.9	70.1	**76.0**	**70.0**	**66.9**	**79.5**	66.9	79.5	66.8	79.6
454.calculix	116	71.0	**117**	**70.6**	117	70.5	107	76.8	108	76.6	**108**	**76.7**
459.GemsFDTD	42.6	249	42.9	247	**42.8**	**248**	**36.2**	**293**	36.2	293	36.5	291
465.tonto	221	44.6	**225**	**43.7**	235	41.9	148	66.3	**149**	**66.2**	149	66.0
470.lbm	8.74	1570	**8.60**	**1600**	8.49	1620	8.74	1570	**8.60**	**1600**	8.49	1620
481.wrf	84.6	132	83.9	133	**84.5**	**132**	84.6	132	83.9	133	**84.5**	**132**
482.sphinx3	316	61.7	327	59.7	**316**	**61.6**	316	61.7	327	59.7	**316**	**61.6**

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
 LLC dead line alloc set to Disable
 Patrol Scrub set to Disable
 DCU Streamer Prefetcher set to Disable
 DCA set to Enable
 Hyper-Threading set to Disable
 Sysinfo program /home/cpu2006-1.2-ic17.0u3/config/sysinfo.rev6993
 Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
 running on stark-02-01 Wed Aug 30 20:16:04 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 8164 CPU @ 2.00GHz
         2 "physical id"s (chips)
         52 "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 : 26
         siblings  : 26
         physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25
         26 27 28 29
         physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25
         26 27 28 29
      cache size : 36608 KB

   From /proc/meminfo
      MemTotal:       395892780 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-02-01 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 Aug 28 11:28

   SPEC is set to: /home/cpu2006-1.2-ic17.0u3
      Filesystem      Type  Size  Used Avail Use% Mounted on
      /dev/sda4       xfs   689G   50G  640G   8% /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 -[TEE113J-1.00]- 06/03/2017
   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 = "52"

 Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM
 memory using Redhat Enterprise Linux 7.2
 Transparent Huge Pages disabled 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.20171004.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.20171004.xml

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