SPEC® CFP2006 Result
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Lenovo Global Technology

$SPECfp^{®}\_rate2006 =$ 1160

ThinkSystem SD530
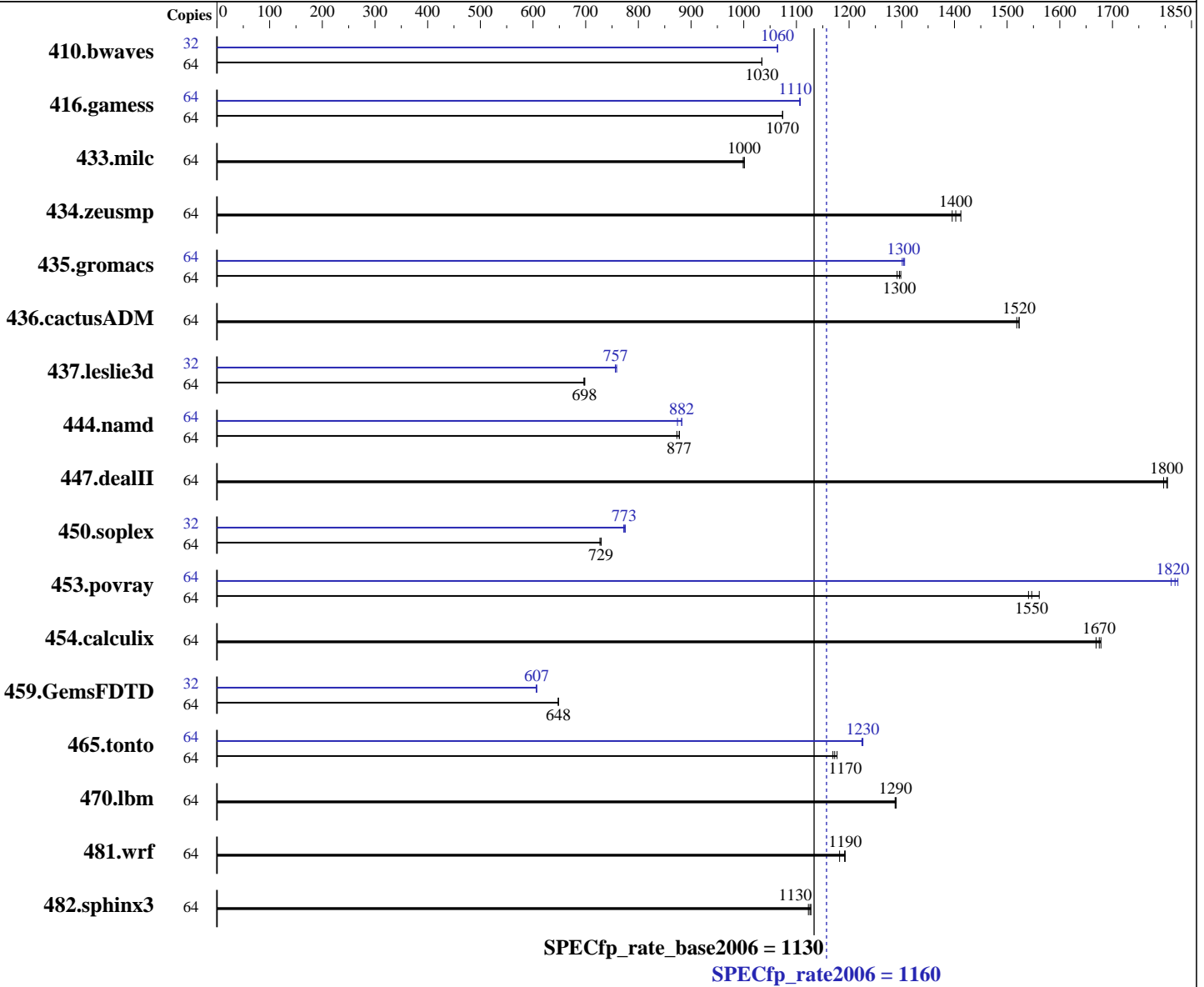(2.00 GHz, Intel Xeon Platinum 8153)

$SPECfp\_rate\_base2006 =$ 1130

CPU2006 license: 9017	**Test date:** Aug-2017
Test sponsor: Lenovo Global Technology	**Hardware Availability:** Aug-2017
Tested by: Lenovo Global Technology	**Software Availability:** Apr-2017

Copies

Benchmark	Copies	Value
410.bwaves	32	1060
	64	1030
416.gamess	64	1110
	64	1070
433.milc	64	1000
434.zeusmp	64	1400
435.gromacs	64	1300
	64	1300
436.cactusADM	64	1520
437.leslie3d	32	757
	64	698
444.namd	64	882
	64	877
447.dealII	64	1800
450.soplex	32	773
	64	729
453.povray	64	1820
	64	1550
454.calculix	64	1670
459.GemsFDTD	32	607
	64	648
465.tonto	64	1230
	64	1170
470.lbm	64	1290
481.wrf	64	1190
482.sphinx3	64	1130

SPECfp_rate_base2006 = 1130

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Hardware

CPU Name:	Intel Xeon Platinum 8153
CPU Characteristics:	Intel Turbo Boost Technology up to 2.80 GHz
CPU MHz:	2000
FPU:	Integrated
CPU(s) enabled:	32 cores, 2 chips, 16 cores/chip, 2 threads/core
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:	22 MB I+D on chip per chip	Base Pointers:	32/64-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						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	64	**841**	**1030**	841	1030	841	1030	32	409	1060	409	1060	**409**	**1060**
416.gamess	64	1167	1070	**1167**	**1070**	1167	1070	64	1131	1110	**1132**	**1110**	1133	1110
433.milc	64	588	999	587	1000	**587**	**1000**	64	588	999	587	1000	**587**	**1000**
434.zeusmp	64	417	1400	**415**	**1400**	412	1410	64	417	1400	**415**	**1400**	412	1410
435.gromacs	64	352	1300	354	1290	**353**	**1300**	64	350	1310	**351**	**1300**	351	1300
436.cactusADM	64	**502**	**1520**	502	1520	504	1520	64	**502**	**1520**	502	1520	504	1520
437.leslie3d	64	864	697	862	698	**862**	**698**	32	396	759	**397**	**757**	398	756
444.namd	64	**585**	**877**	585	878	588	873	64	582	882	587	874	**582**	**882**
447.dealII	64	**406**	**1800**	407	1800	406	1800	64	**406**	**1800**	407	1800	406	1800
450.soplex	64	734	727	732	729	**732**	**729**	32	344	775	346	772	**345**	**773**
453.povray	64	218	1560	**220**	**1550**	221	1540	64	187	1820	188	1810	**187**	**1820**
454.calculix	64	315	1680	316	1670	**315**	**1670**	64	315	1680	316	1670	**315**	**1670**
459.GemsFDTD	64	**1048**	**648**	1048	648	1047	648	32	**559**	**607**	559	607	560	606
465.tonto	64	**537**	**1170**	535	1180	539	1170	64	514	1220	**514**	**1230**	514	1230
470.lbm	64	682	1290	**683**	**1290**	683	1290	64	682	1290	**683**	**1290**	683	1290
481.wrf	64	**600**	**1190**	599	1190	605	1180	64	**600**	**1190**	599	1190	605	1180
482.sphinx3	64	1106	1130	**1108**	**1130**	1111	1120	64	1106	1130	**1108**	**1130**	1111	1120

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

Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit'
was used to generate numactl 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 Configuration:
  DCU Streamer Prefetcher set to Disable
  Uncore Frequency Scaling set to Disable

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Platform Notes (Continued)

```
Stale AtoS set to Enable
LLC dead line alloc set to Disable
SNC set to Enable
Sysinfo program /home/cpu2006-1.2-ic17.0u3/config/sysinfo.rev6993
Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
running on stark-02-01 Tue Aug  1 03:11:13 2017

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 8153 CPU @ 2.00GHz
      2 "physical id"s (chips)
      64 "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 : 16
      siblings  : 32
      physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
      physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
   cache size : 22528 KB

From /proc/meminfo
   MemTotal:       395893288 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 Jul 31 14:24
```

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Platform Notes (Continued)

```
   SPEC is set to: /home/cpu2006-1.2-ic17.0u3
     Filesystem      Type   Size   Used Avail Use% Mounted on
     /dev/sda4       xfs    689G    61G  629G   9% /home
   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 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:
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"


 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 by default
 Filesystem page cache cleared with:
 shell invocation of 'sync; echo 3 > /proc/sys/vm/drop_caches' prior to run
 runspec command invoked through numactl i.e.:
 numactl --interleave=all runspec <etc>
```

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

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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

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
  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 -qopt-prefetch -auto-p32
    -qopt-mem-layout-trans=3
```

C++ benchmarks:
```
    -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -auto-p32
    -qopt-mem-layout-trans=3
```

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

Benchmarks using both Fortran and C:
```
    -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -auto-p32
    -qopt-mem-layout-trans=3
```

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_2017/linux/lib/ia32
```

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Peak Compiler Invocation (Continued)

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
      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: -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
              -qopt-mem-layout-trans=3

    447.dealII: basepeak = yes
```

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Peak Optimization Flags (Continued)

450.soplex: `-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) -qopt-malloc-options=3`
`-qopt-mem-layout-trans=3`

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 -qopt-mem-layout-trans=3`

Fortran benchmarks:

410.bwaves: `-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch`

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: `Same as 410.bwaves`

459.GemsFDTD: `Same as 410.bwaves`

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) -unroll4 -auto -inline-calloc`
`-qopt-malloc-options=3`

Benchmarks using both Fortran and C:

435.gromacs: `-prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)`
`-par-num-threads=1(pass 1) -qopt-prefetch -auto-ilp32`
`-qopt-mem-layout-trans=3`

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

Tested with SPEC CPU2006 v1.2.
Report generated on Wed Oct 4 12:37:00 2017 by SPEC CPU2006 PS/PDF formatter v6932.
Originally published on 3 October 2017.