



# SPEC® CFP2006 Result

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## Lenovo Global Technology

ThinkSystem SR570  
(2.00 GHz, Intel Xeon Platinum 8164)

SPECfp®2006 = 147

SPECfp\_base2006 = 140

CPU2006 license: 9017

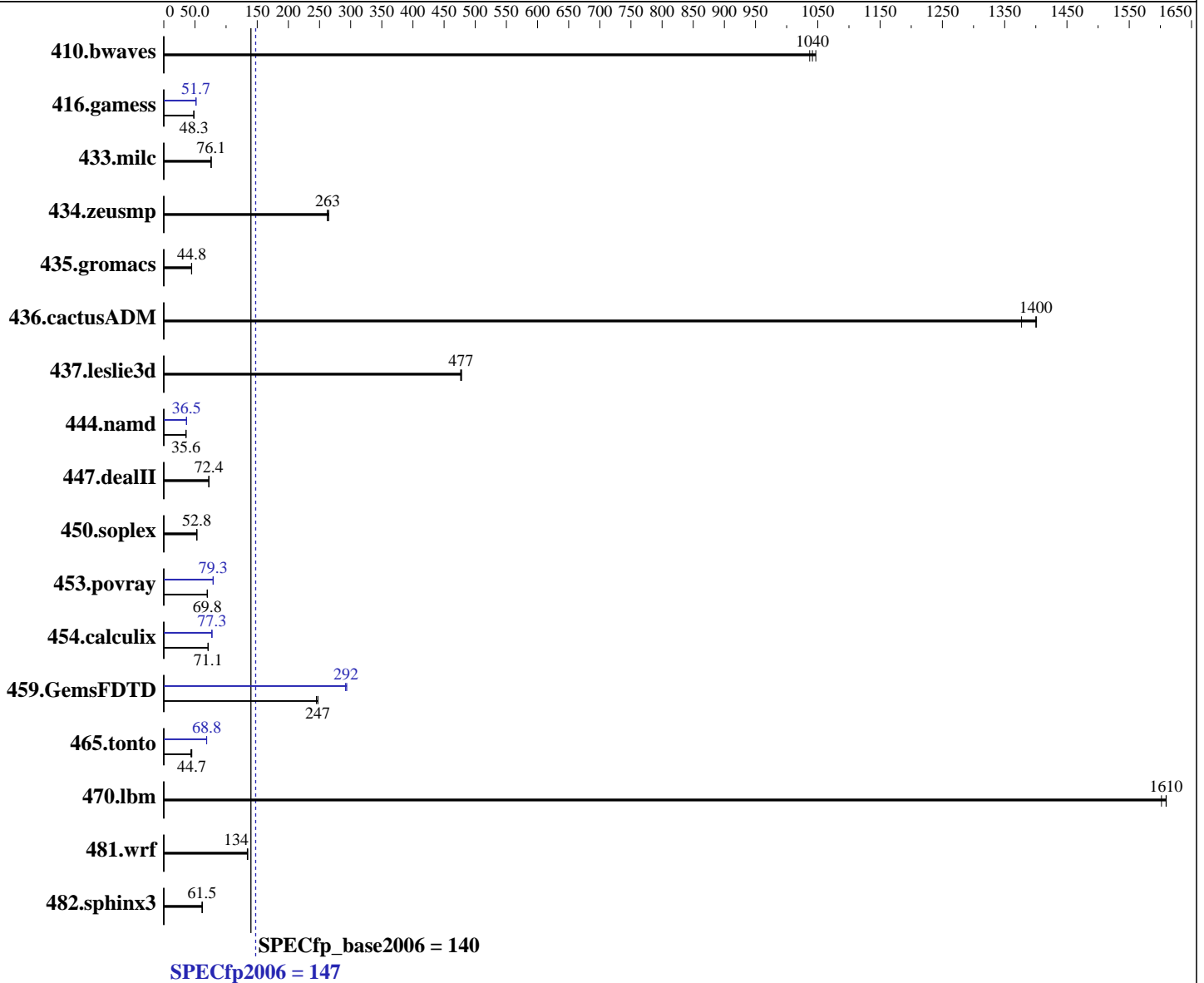
Test sponsor: Lenovo Global Technology

Tested by: Lenovo Global Technology

Test date: Nov-2017

Hardware Availability: Nov-2017

Software Availability: Jul-2017



### 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

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### Software

Operating System: SUSE Linux Enterprise Server 12 SP3 (x86\_64)  
 Kernel 4.4.73-5-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: btrfs  
 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: 192 GB (12 x 16 GB 2Rx8 PC4-2666V-R)  
Disk Subsystem: 1 x 800 GB SAS 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	<b><u>13.1</u></b>	<b><u>1040</u></b>	13.0	1050	13.1	1040	<b><u>13.1</u></b>	<b><u>1040</u></b>	13.0	1050	13.1	1040
416.gamess	405	48.3	406	48.3	<b><u>405</u></b>	<b><u>48.3</u></b>	378	51.7	379	51.6	<b><u>379</u></b>	<b><u>51.7</u></b>
433.milc	<b><u>121</u></b>	<b><u>76.1</u></b>	121	76.1	121	75.7	<b><u>121</u></b>	<b><u>76.1</u></b>	121	76.1	121	75.7
434.zeusmp	34.7	262	34.4	265	<b><u>34.6</u></b>	<b><u>263</u></b>	34.7	262	34.4	265	<b><u>34.6</u></b>	<b><u>263</u></b>
435.gromacs	<b><u>160</u></b>	<b><u>44.8</u></b>	159	44.8	161	44.4	<b><u>160</u></b>	<b><u>44.8</u></b>	159	44.8	161	44.4
436.cactusADM	<b><u>8.54</u></b>	<b><u>1400</u></b>	8.68	1380	8.53	1400	<b><u>8.54</u></b>	<b><u>1400</u></b>	8.68	1380	8.53	1400
437.leslie3d	<b><u>19.7</u></b>	<b><u>477</u></b>	19.7	477	19.7	478	<b><u>19.7</u></b>	<b><u>477</u></b>	19.7	477	19.7	478
444.namd	225	35.7	<b><u>225</u></b>	<b><u>35.6</u></b>	225	35.6	<b><u>220</u></b>	<b><u>36.5</u></b>	220	36.5	220	36.5
447.dealII	158	72.5	<b><u>158</u></b>	<b><u>72.4</u></b>	158	72.3	158	72.5	<b><u>158</u></b>	<b><u>72.4</u></b>	158	72.3
450.soplex	156	53.4	<b><u>158</u></b>	<b><u>52.8</u></b>	158	52.8	156	53.4	<b><u>158</u></b>	<b><u>52.8</u></b>	158	52.8
453.povray	76.3	69.8	76.0	70.0	<b><u>76.2</u></b>	<b><u>69.8</u></b>	<b><u>67.1</u></b>	<b><u>79.3</u></b>	67.1	79.3	67.2	79.1
454.calculix	116	71.4	<b><u>116</u></b>	<b><u>71.1</u></b>	116	70.9	107	77.1	<b><u>107</u></b>	<b><u>77.3</u></b>	107	77.3
459.GemsFDTD	<b><u>42.9</u></b>	<b><u>247</u></b>	43.3	245	42.9	247	36.1	294	36.4	292	<b><u>36.3</u></b>	<b><u>292</u></b>
465.tonto	226	43.5	<b><u>220</u></b>	<b><u>44.7</u></b>	219	45.0	<b><u>143</u></b>	<b><u>68.8</u></b>	143	68.7	143	68.8
470.lbm	8.54	1610	<b><u>8.54</u></b>	<b><u>1610</u></b>	8.58	1600	8.54	1610	<b><u>8.54</u></b>	<b><u>1610</u></b>	8.58	1600
481.wrf	82.9	135	83.3	134	<b><u>83.1</u></b>	<b><u>134</u></b>	82.9	135	83.3	134	<b><u>83.1</u></b>	<b><u>134</u></b>
482.sphinx3	314	62.0	<b><u>317</u></b>	<b><u>61.5</u></b>	317	61.5	314	62.0	<b><u>317</u></b>	<b><u>61.5</u></b>	317	61.5

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:  
Choose Operating Mode set to Maximum Performance  
Hyper-Threading set to Disable  
Execute Disable Bit set to Disable  
DCA set to Enable  
MONITORMWAIT set to Enable  
XPT Prefetcher set to Enable  
LLC Deadline Alloc set to Disable  
Sysinfo program /home/cpu2006-1.2-ic17.0u3/config/sysinfo.rev6993  
Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)

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### Platform Notes (Continued)

running on linux-3fwh Sun Nov 5 16:33:40 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 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:      197431360 kB
HugePages_Total: 0
Hugepagesize:  2048 kB

```

From /etc/\*release\* /etc/\*version\*

```

SuSE-release:
SUSE Linux Enterprise Server 12 (x86_64)
VERSION = 12
PATCHLEVEL = 3
# 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-SP3"
VERSION_ID="12.3"
PRETTY_NAME="SUSE Linux Enterprise Server 12 SP3"
ID="sles"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:12:sp3"

```

uname -a:

```

Linux linux-3fwh 4.4.73-5-default #1 SMP Tue Jul 4 15:33:39 UTC 2017
(b7ce4e4) x86_64 x86_64 x86_64 GNU/Linux

```

run-level 3 Oct 31 22:58

SPEC is set to: /home/cpu2006-1.2-ic17.0u3

```

Filesystem      Type      Size  Used Avail Use% Mounted on
/dev/sda2       btrfs    744G  7.3G  736G   1% /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 Lenovo -[TEE119J-1.20]- 09/06/2017

Memory:

4x NO DIMM NO DIMM

12x Samsung M393A2K43BB1-CTD 16 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

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## Base Portability Flags (Continued)

```

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 -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-F.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-F.xml>

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For other inquiries, please contact [webmaster@spec.org](mailto:webmaster@spec.org).

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