



# SPEC® CFP2006 Result

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## Lenovo Global Technology

SPECfp®2006 = 149

ThinkSystem SR590  
(2.00 GHz, Intel Xeon Platinum 8164)

SPECfp\_base2006 = 141

CPU2006 license: 9017

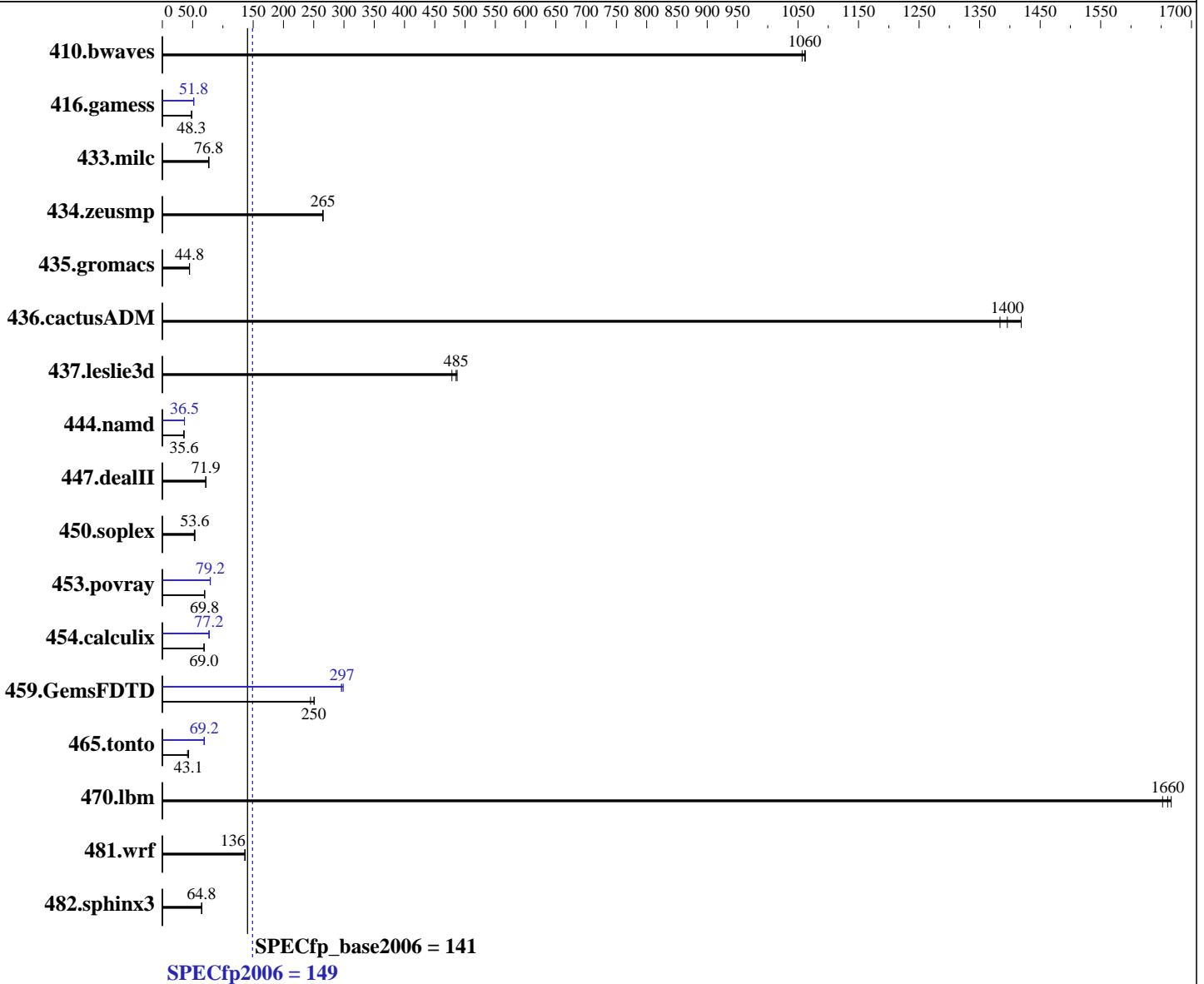
Test date: Nov-2017

Test sponsor: Lenovo Global Technology

Hardware Availability: Nov-2017

Tested by: Lenovo Global Technology

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 17.0.0.098 of Intel C/C++ Compiler for Linux;  
 Fortran: Version 17.0.0.098 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: 384 GB (12 x 32 GB 2Rx4 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	12.8	1060	<b><u>12.8</u></b>	<b><u>1060</u></b>	12.9	1060	12.8	1060	<b><u>12.8</u></b>	<b><u>1060</u></b>	12.9	1060
416.gamess	<b><u>405</u></b>	<b><u>48.3</u></b>	405	48.3	405	48.3	378	51.8	<b><u>378</u></b>	<b><u>51.8</u></b>	378	51.9
433.milc	<b><u>120</u></b>	<b><u>76.8</u></b>	119	76.9	120	76.4	<b><u>120</u></b>	<b><u>76.8</u></b>	119	76.9	120	76.4
434.zeusmp	34.3	265	<b><u>34.3</u></b>	<b><u>265</u></b>	34.3	265	34.3	265	<b><u>34.3</u></b>	<b><u>265</u></b>	34.3	265
435.gromacs	159	44.8	<b><u>159</u></b>	<b><u>44.8</u></b>	159	44.8	159	44.8	<b><u>159</u></b>	<b><u>44.8</u></b>	159	44.8
436.cactusADM	8.42	1420	<b><u>8.56</u></b>	<b><u>1400</u></b>	8.64	1380	8.42	1420	<b><u>8.56</u></b>	<b><u>1400</u></b>	8.64	1380
437.leslie3d	<b><u>19.4</u></b>	<b><u>485</u></b>	19.7	478	19.3	487	<b><u>19.4</u></b>	<b><u>485</u></b>	19.7	478	19.3	487
444.namd	225	35.7	225	35.6	<b><u>225</u></b>	<b><u>35.6</u></b>	220	36.5	<b><u>220</u></b>	<b><u>36.5</u></b>	220	36.5
447.dealII	160	71.5	<b><u>159</u></b>	<b><u>71.9</u></b>	159	72.1	160	71.5	<b><u>159</u></b>	<b><u>71.9</u></b>	159	72.1
450.soplex	158	52.8	155	53.7	<b><u>156</u></b>	<b><u>53.6</u></b>	158	52.8	155	53.7	<b><u>156</u></b>	<b><u>53.6</u></b>
453.povray	76.1	69.9	76.4	69.6	<b><u>76.3</u></b>	<b><u>69.8</u></b>	67.1	79.3	<b><u>67.1</u></b>	<b><u>79.2</u></b>	67.4	79.0
454.calculix	120	69.0	120	68.9	<b><u>120</u></b>	<b><u>69.0</u></b>	107	77.3	<b><u>107</u></b>	<b><u>77.2</u></b>	107	77.1
459.GemsFDTD	<b><u>42.4</u></b>	<b><u>250</u></b>	43.4	245	42.2	251	<b><u>35.8</u></b>	<b><u>297</u></b>	35.5	299	35.9	296
465.tonto	<b><u>229</u></b>	<b><u>43.1</u></b>	237	41.6	227	43.4	143	68.8	<b><u>142</u></b>	<b><u>69.2</u></b>	141	69.5
470.lbm	<b><u>8.27</u></b>	<b><u>1660</u></b>	8.24	1670	8.32	1650	<b><u>8.27</u></b>	<b><u>1660</u></b>	8.24	1670	8.32	1650
481.wrf	82.0	136	81.7	137	<b><u>81.9</u></b>	<b><u>136</u></b>	82.0	136	81.7	137	<b><u>81.9</u></b>	<b><u>136</u></b>
482.sphinx3	301	64.8	298	65.4	<b><u>301</u></b>	<b><u>64.8</u></b>	301	64.8	298	65.4	<b><u>301</u></b>	<b><u>64.8</u></b>

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  
MONITORMWAIT set to Enable  
Per Core P-state set to Disable  
XPT Prefetcher set to Enable  
LLC Deadline Alloc set to Disable  
Sysinfo program /home/cpu2006-1.2-ic17.0/config/sysinfo.rev6993  
Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)

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Software Availability: Jul-2017

### Platform Notes (Continued)

running on SR590-1 Sun Nov 5 00:38:40 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:      395915620 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 SR590-1 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 Nov 4 16:29

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

```

Filesystem      Type      Size      Used Avail Use% Mounted on
/dev/sdb2       btrfs    744G      136G  608G  19% /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:

12x Hynix HMA84GR7AFR4N-VK 32 GB 2 rank 2666 MHz  
4x NO DIMM NO DIMM

(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-ic17.0/libs/32:/home/cpu2006-1.2-ic17.0/libs/64:/home/cpu2006-1.2-ic17.0/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

## 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 -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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