



# SPEC<sup>®</sup> CFP2006 Result

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## Lenovo Global Technology

ThinkSystem SR950  
(2.10 GHz, Intel Xeon Platinum 8160)

SPECfp<sup>®</sup>2006 = **130**

SPECfp\_base2006 = **124**

CPU2006 license: 9017

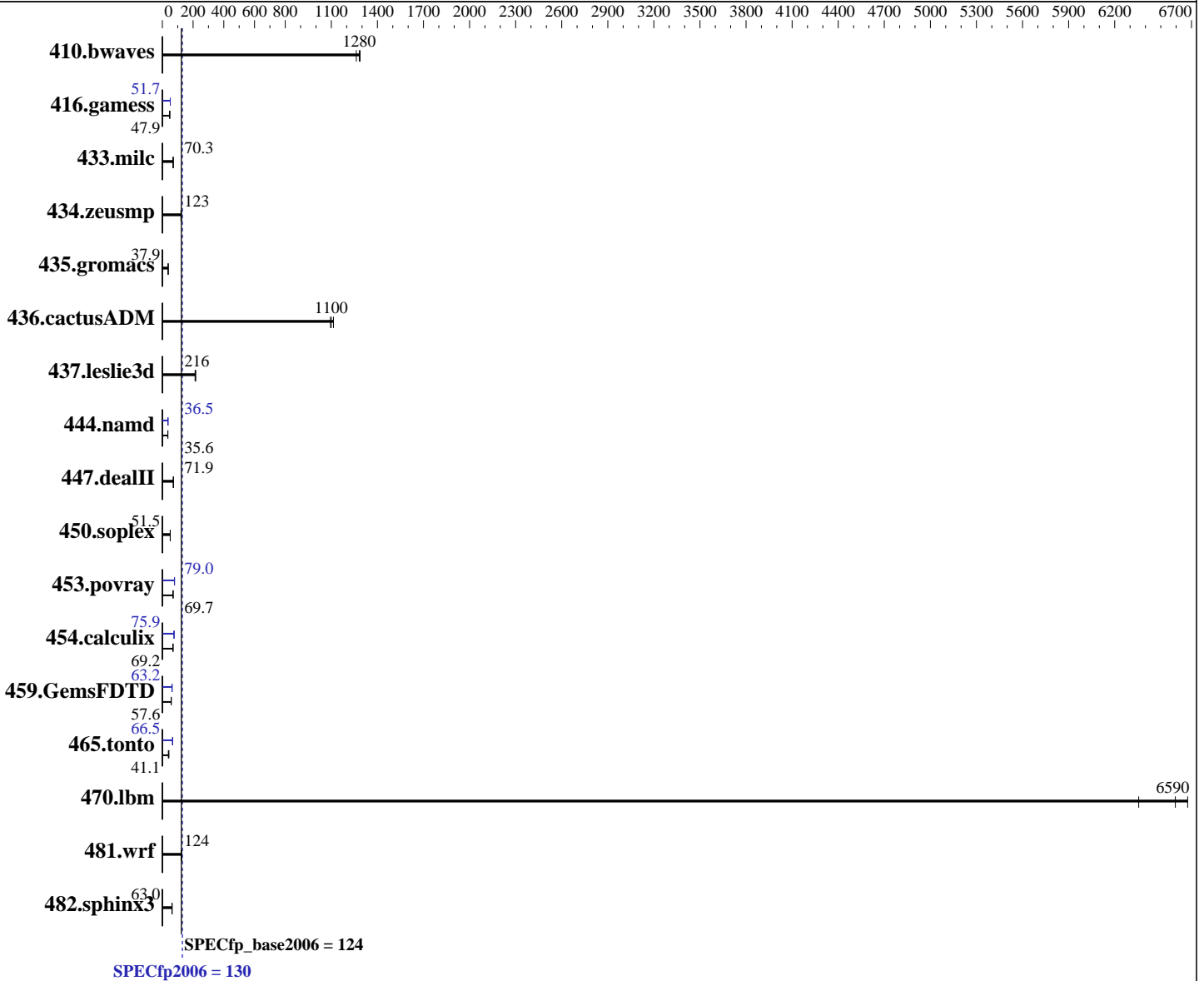
Test sponsor: Lenovo Global Technology

Tested by: Lenovo Global Technology

Test date: Aug-2017

Hardware Availability: Sep-2017

Software Availability: Apr-2017



### Hardware

CPU Name: Intel Xeon Platinum 8160  
 CPU Characteristics: Intel Turbo Boost Technology up to 3.70 GHz  
 CPU MHz: 2100  
 FPU: Integrated  
 CPU(s) enabled: 192 cores, 8 chips, 24 cores/chip  
 CPU(s) orderable: 2,4,8 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 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: btrfs  
 System State: Run level 3 (multi-user)

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L3 Cache: 33 MB I+D on chip per chip  
Other Cache: None  
Memory: 3 TB (96 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	10.8	1260	<b><u>10.6</u></b>	<b><u>1280</u></b>	10.6	1290	10.8	1260	<b><u>10.6</u></b>	<b><u>1280</u></b>	10.6	1290
416.gamess	408	48.0	409	47.9	<b><u>408</u></b>	<b><u>47.9</u></b>	380	51.5	379	51.7	<b><u>379</u></b>	<b><u>51.7</u></b>
433.milc	129	71.2	<b><u>131</u></b>	<b><u>70.3</u></b>	132	69.8	129	71.2	<b><u>131</u></b>	<b><u>70.3</u></b>	132	69.8
434.zeusmp	75.3	121	<b><u>74.1</u></b>	<b><u>123</u></b>	73.5	124	75.3	121	<b><u>74.1</u></b>	<b><u>123</u></b>	73.5	124
435.gromacs	191	37.5	189	37.9	<b><u>189</u></b>	<b><u>37.9</u></b>	191	37.5	189	37.9	<b><u>189</u></b>	<b><u>37.9</u></b>
436.cactusADM	<b><u>10.9</u></b>	<b><u>1100</u></b>	10.7	1110	10.9	1090	<b><u>10.9</u></b>	<b><u>1100</u></b>	10.7	1110	10.9	1090
437.leslie3d	<b><u>43.5</u></b>	<b><u>216</u></b>	44.1	213	43.4	217	<b><u>43.5</u></b>	<b><u>216</u></b>	44.1	213	43.4	217
444.namd	225	35.6	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	159	71.9	160	71.5	<b><u>159</u></b>	<b><u>71.9</u></b>	159	71.9	160	71.5	<b><u>159</u></b>	<b><u>71.9</u></b>
450.soplex	164	51.0	162	51.6	<b><u>162</u></b>	<b><u>51.5</u></b>	164	51.0	162	51.6	<b><u>162</u></b>	<b><u>51.5</u></b>
453.povray	<b><u>76.3</u></b>	<b><u>69.7</u></b>	76.4	69.6	76.3	69.7	<b><u>67.3</u></b>	<b><u>79.0</u></b>	67.5	78.9	67.1	79.2
454.calculix	120	69.0	119	69.2	<b><u>119</u></b>	<b><u>69.2</u></b>	108	76.3	109	75.9	<b><u>109</u></b>	<b><u>75.9</u></b>
459.GemsFDTD	183	58.0	<b><u>184</u></b>	<b><u>57.6</u></b>	186	57.1	169	62.9	<b><u>168</u></b>	<b><u>63.2</u></b>	168	63.2
465.tonto	<b><u>239</u></b>	<b><u>41.1</u></b>	254	38.8	231	42.7	<b><u>148</u></b>	<b><u>66.5</u></b>	148	66.3	148	66.6
470.lbm	2.06	6670	<b><u>2.08</u></b>	<b><u>6590</u></b>	2.16	6360	2.06	6670	<b><u>2.08</u></b>	<b><u>6590</u></b>	2.16	6360
481.wrf	89.9	124	90.7	123	<b><u>90.2</u></b>	<b><u>124</u></b>	89.9	124	90.7	123	<b><u>90.2</u></b>	<b><u>124</u></b>
482.sphinx3	309	63.0	<b><u>309</u></b>	<b><u>63.0</u></b>	310	62.9	309	63.0	<b><u>309</u></b>	<b><u>63.0</u></b>	310	62.9

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  
Sysinfo program /home/cpu2006-1.2-ic17.0u3/config/sysinfo.rev6993  
Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)  
running on Proton8S-SUSE12SP2 Sat Aug 19 12:33:36 2017

This section contains SUT (System Under Test) info as seen by some common utilities. To remove or add to this section, see:

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**Test sponsor:** Lenovo Global Technology

**Hardware Availability:** Sep-2017

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**Software Availability:** Apr-2017

### Platform Notes (Continued)

<http://www.spec.org/cpu2006/Docs/config.html#sysinfo>

From /proc/cpuinfo

```

model name : Intel(R) Xeon(R) Platinum 8160 CPU @ 2.10GHz
 8 "physical id"s (chips)
192 "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 : 24
  siblings  : 24
physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26
27 28 29
physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26
27 28 29
physical 2: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26
27 28 29
physical 3: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26
27 28 29
physical 4: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26
27 28 29
physical 5: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26
27 28 29
physical 6: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26
27 28 29
physical 7: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26
27 28 29
cache size : 33792 KB

```

From /proc/meminfo

```

MemTotal:      3170209980 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:

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## Platform Notes (Continued)

```
Linux Proton8S-SUSE12SP2 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 19 12:31
```

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

```
Filesystem      Type      Size  Used Avail Use% Mounted on
/dev/sdb3        btrfs    743G   62G  682G   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 -[PSE105L-1.00]- 06/22/2017
```

```
Memory:
```

```
96x 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 = "192"
```

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
```



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## 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 -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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