



# SPEC<sup>®</sup> CFP2006 Result

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## Lenovo Global Technology

ThinkSystem SR850  
(3.60 GHz, Intel Xeon Gold 5122)

SPECfp<sup>®</sup>2006 = **136**

SPECfp\_base2006 = **132**

CPU2006 license: 9017

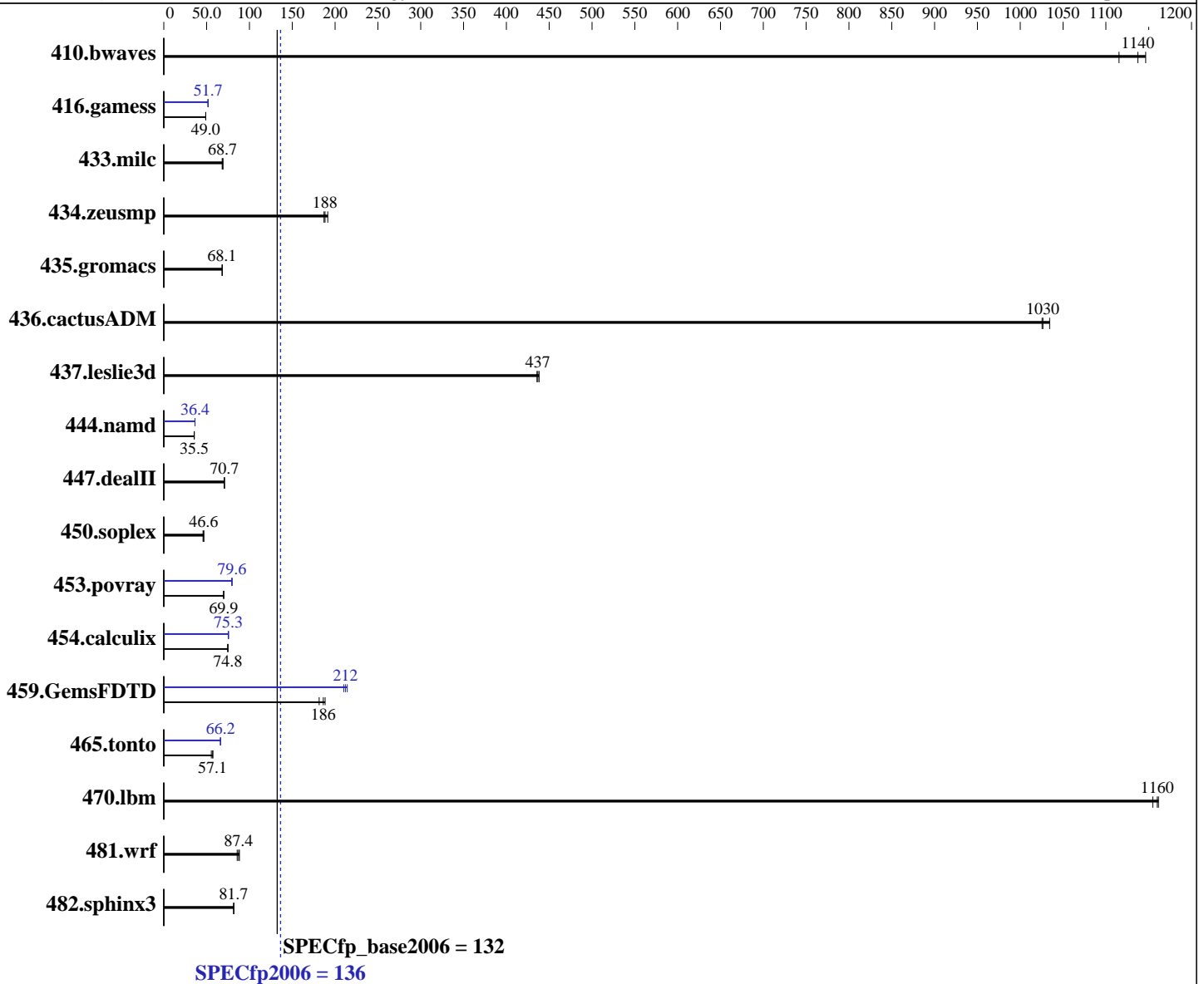
Test sponsor: Lenovo Global Technology

Tested by: Lenovo Global Technology

Test date: Sep-2017

Hardware Availability: Aug-2017

Software Availability: Apr-2017



### Hardware

CPU Name: Intel Xeon Gold 5122  
 CPU Characteristics: Intel Turbo Boost Technology up to 3.70 GHz  
 CPU MHz: 3600  
 FPU: Integrated  
 CPU(s) enabled: 16 cores, 4 chips, 4 cores/chip  
 CPU(s) orderable: 2,4 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: xfs  
 System State: Run level 3 (multi-user)

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L3 Cache: 16.5 MB I+D on chip per chip  
Other Cache: None  
Memory: 1536 GB (48 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	12.2	1120	<u>11.9</u>	<u>1140</u>	11.9	1150	12.2	1120	<u>11.9</u>	<u>1140</u>	11.9	1150
416.gamess	<b>400</b>	<b>49.0</b>	400	48.9	399	49.0	380	51.6	<b>379</b>	<b>51.7</b>	378	51.7
433.milc	133	69.1	<b>134</b>	<b>68.7</b>	135	68.1	133	69.1	<b>134</b>	<b>68.7</b>	135	68.1
434.zeusmp	48.6	187	<b>48.3</b>	<b>188</b>	47.5	191	48.6	187	<b>48.3</b>	<b>188</b>	47.5	191
435.gromacs	<b>105</b>	<b>68.1</b>	104	68.4	105	68.1	<b>105</b>	<b>68.1</b>	104	68.4	105	68.1
436.cactusADM	<b>11.6</b>	<b>1030</b>	11.7	1030	11.6	1030	<b>11.6</b>	<b>1030</b>	11.7	1030	11.6	1030
437.leslie3d	21.6	436	<b>21.5</b>	<b>437</b>	21.5	438	21.6	436	<b>21.5</b>	<b>437</b>	21.5	438
444.namd	226	35.5	<b>226</b>	<b>35.5</b>	226	35.5	220	36.4	220	36.4	<b>220</b>	<b>36.4</b>
447.dealII	<b>162</b>	<b>70.7</b>	161	70.9	162	70.6	<b>162</b>	<b>70.7</b>	161	70.9	162	70.6
450.soplex	178	46.7	<b>179</b>	<b>46.6</b>	182	45.8	178	46.7	<b>179</b>	<b>46.6</b>	182	45.8
453.povray	76.0	70.0	<b>76.1</b>	<b>69.9</b>	76.1	69.9	<b>66.9</b>	<b>79.6</b>	66.7	79.8	67.0	79.4
454.calculix	110	74.8	<b>110</b>	<b>74.8</b>	110	74.7	109	75.7	110	75.3	<b>110</b>	<b>75.3</b>
459.GemsFDTD	58.5	181	<b>57.0</b>	<b>186</b>	56.3	188	50.5	210	<b>50.0</b>	<b>212</b>	49.5	214
465.tonto	<b>172</b>	<b>57.1</b>	172	57.3	177	55.5	<b>149</b>	<b>66.2</b>	149	66.1	148	66.3
470.lbm	<b>11.8</b>	<b>1160</b>	11.8	1160	11.9	1150	<b>11.8</b>	<b>1160</b>	11.8	1160	11.9	1150
481.wrf	130	85.7	126	88.3	<b>128</b>	<b>87.4</b>	130	85.7	126	88.3	<b>128</b>	<b>87.4</b>
482.sphinx3	<b>239</b>	<b>81.7</b>	239	81.6	239	81.7	<b>239</b>	<b>81.7</b>	239	81.6	239	81.7

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

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 Electron-node-02 Sun Sep 24 23:11:15 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) Gold 5122 CPU @ 3.60GHz
 4 "physical id"s (chips)
16 "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 : 4
  siblings  : 4
  physical 0: cores 1 2 5 11
  physical 1: cores 1 5 9 13
  physical 2: cores 1 10 11 12
  physical 3: cores 2 3 4 10
cache size : 16896 KB

```

```

From /proc/meminfo
MemTotal:      1584976144 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 Electron-node-02 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 Sep 24 23:07

```

SPEC is set to: /home/cpu2006-1.2-ic17.0u3
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sda4       xfs   688G  116G  573G  17% /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:

48x 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 = "16"

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/enable

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

434.zeusmp: -DSPEC\_CPU\_LP64

435.gromacs: -DSPEC\_CPU\_LP64 -nofor\_main

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## Base Portability Flags (Continued)

```

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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