



# SPEC® CFP2006 Result

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## Lenovo Global Technology

SPECfp®2006 = **153**

ThinkSystem SR950  
(3.00 GHz, Intel Xeon Gold 6154)

SPECfp\_base2006 = **148**

CPU2006 license: 9017

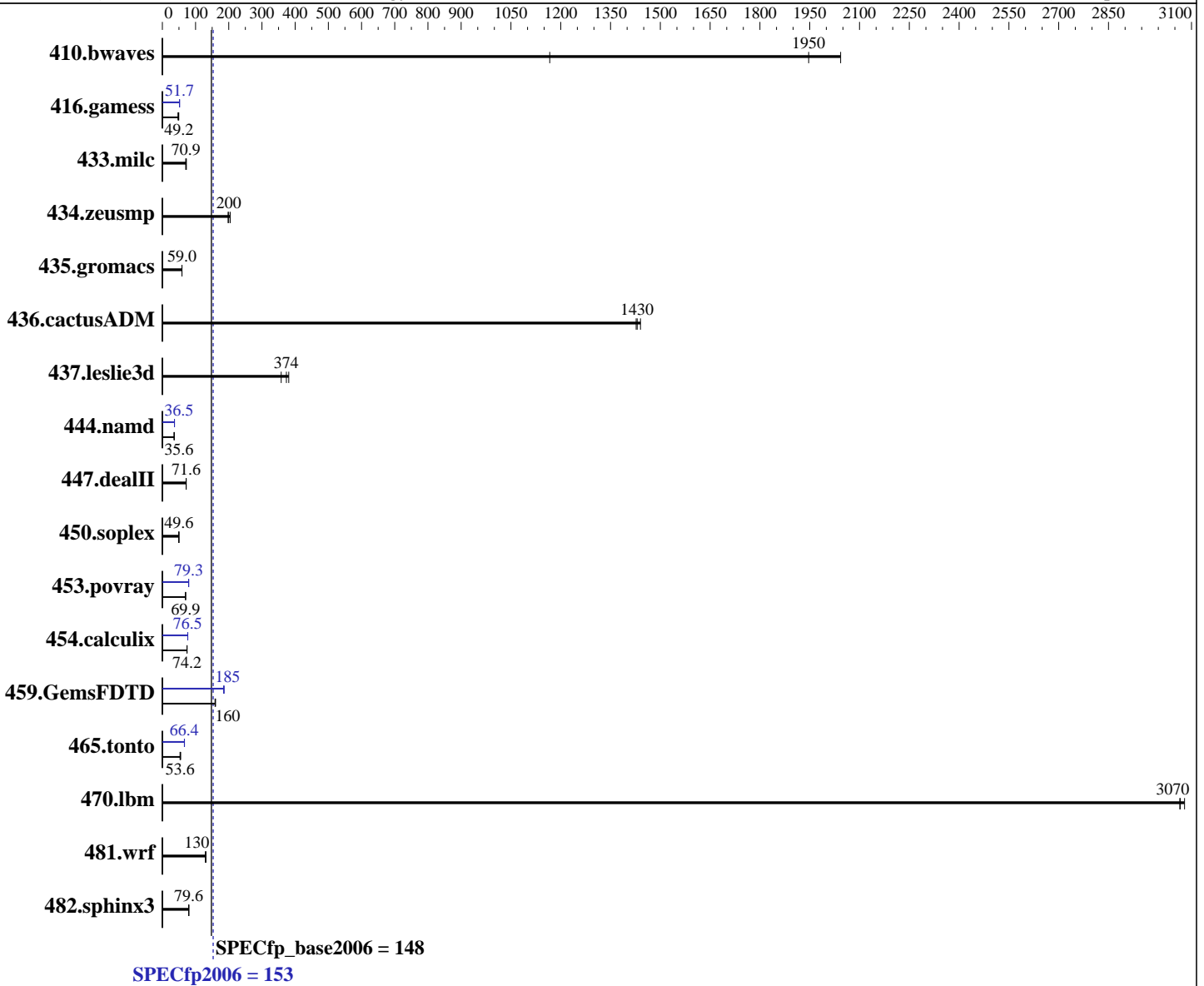
Test date: Jul-2017

Test sponsor: Lenovo Global Technology

Hardware Availability: Sep-2017

Tested by: Lenovo Global Technology

Software Availability: Apr-2017



### Hardware

CPU Name: Intel Xeon Gold 6154  
 CPU Characteristics: Intel Turbo Boost Technology up to 3.70 GHz  
 CPU MHz: 3000  
 FPU: Integrated  
 CPU(s) enabled: 72 cores, 4 chips, 18 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: btrfs  
 System State: Run level 3 (multi-user)

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L3 Cache: 24.75 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	11.6	1170	<b><u>6.98</u></b>	<b><u>1950</u></b>	6.65	2040	11.6	1170	<b><u>6.98</u></b>	<b><u>1950</u></b>	6.65	2040
416.gamess	417	46.9	<b><u>398</u></b>	<b><u>49.2</u></b>	398	49.2	378	51.7	379	51.7	<b><u>379</u></b>	<b><u>51.7</u></b>
433.milc	<b><u>129</u></b>	<b><u>70.9</u></b>	130	70.7	127	72.4	<b><u>129</u></b>	<b><u>70.9</u></b>	130	70.7	127	72.4
434.zeusmp	<b><u>45.5</u></b>	<b><u>200</u></b>	46.0	198	44.5	204	<b><u>45.5</u></b>	<b><u>200</u></b>	46.0	198	44.5	204
435.gromacs	121	59.1	121	59.0	<b><u>121</u></b>	<b><u>59.0</u></b>	121	59.1	121	59.0	<b><u>121</u></b>	<b><u>59.0</u></b>
436.cactusADM	<b><u>8.36</u></b>	<b><u>1430</u></b>	8.30	1440	8.37	1430	<b><u>8.36</u></b>	<b><u>1430</u></b>	8.30	1440	8.37	1430
437.leslie3d	26.3	358	<b><u>25.2</u></b>	<b><u>374</u></b>	24.7	381	26.3	358	<b><u>25.2</u></b>	<b><u>374</u></b>	24.7	381
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	36.4
447.dealII	<b><u>160</u></b>	<b><u>71.6</u></b>	159	71.9	160	71.4	<b><u>160</u></b>	<b><u>71.6</u></b>	159	71.9	160	71.4
450.soplex	167	50.0	168	49.5	<b><u>168</u></b>	<b><u>49.6</u></b>	167	50.0	168	49.5	<b><u>168</u></b>	<b><u>49.6</u></b>
453.povray	76.1	69.9	<b><u>76.1</u></b>	<b><u>69.9</u></b>	76.2	69.9	67.4	79.0	<b><u>67.1</u></b>	<b><u>79.3</u></b>	67.0	79.4
454.calculix	111	74.4	<b><u>111</u></b>	<b><u>74.2</u></b>	111	74.1	108	76.7	108	76.4	<b><u>108</u></b>	<b><u>76.5</u></b>
459.GemsFDTD	66.9	159	66.3	160	<b><u>66.5</u></b>	<b><u>160</u></b>	<b><u>57.3</u></b>	<b><u>185</u></b>	57.1	186	57.5	185
465.tonto	184	53.5	<b><u>184</u></b>	<b><u>53.6</u></b>	178	55.2	148	66.3	148	66.7	<b><u>148</u></b>	<b><u>66.4</u></b>
470.lbm	4.48	3060	<b><u>4.48</u></b>	<b><u>3070</u></b>	4.46	3080	4.48	3060	<b><u>4.48</u></b>	<b><u>3070</u></b>	4.46	3080
481.wrf	86.0	130	<b><u>85.8</u></b>	<b><u>130</u></b>	85.1	131	86.0	130	<b><u>85.8</u></b>	<b><u>130</u></b>	85.1	131
482.sphinx3	<b><u>245</u></b>	<b><u>79.6</u></b>	245	79.4	245	79.7	<b><u>245</u></b>	<b><u>79.6</u></b>	245	79.4	245	79.7

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  
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 Proton4S-SUSE12SP2 Tue Jul 18 15:16:57 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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**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) Gold 6154 CPU @ 3.00GHz
 4 "physical id"s (chips)
 72 "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 : 18
siblings   : 18
physical 0: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
physical 1: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
physical 2: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
physical 3: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
```

cache size : 25344 KB

From /proc/meminfo

```
MemTotal:      1584767276 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 Proton4S-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 Jul 18 15:15

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

```
Filesystem      Type      Size  Used Avail Use% Mounted on
/dev/sda3       btrfs    743G  135G  604G  19% /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

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## Platform Notes (Continued)

determined", but the intent may not be met, as there are frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.

BIOS Lenovo -[PSE105I-1.00]- 06/12/2017

Memory:

48x NO DIMM NO DIMM

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 = "72"

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

433.milc: -DSPEC\_CPU\_LP64

434.zeusmp: -DSPEC\_CPU\_LP64

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

436.cactusADM: -DSPEC\_CPU\_LP64 -nofor\_main

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## Base Portability Flags (Continued)

```

437.leslie3d: -DSPEC_CPU_LP64
444.namd: -DSPEC_CPU_LP64
447.deall: -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

## Peak Portability Flags

Same as Base Portability Flags



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## 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

### Benchmarks using both Fortran and C:

435.gromacs: basepeak = yes

436.cactusADM: basepeak = yes

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## Peak Optimization Flags (Continued)

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-E.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-E.xml>

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

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