



# SPEC® CFP2006 Result

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## Lenovo Global Technology

SPECfp®2006 = **119**

ThinkSystem ST550  
(2.20 GHz, Intel Xeon Silver 4114)

SPECfp\_base2006 = **113**

CPU2006 license: 9017

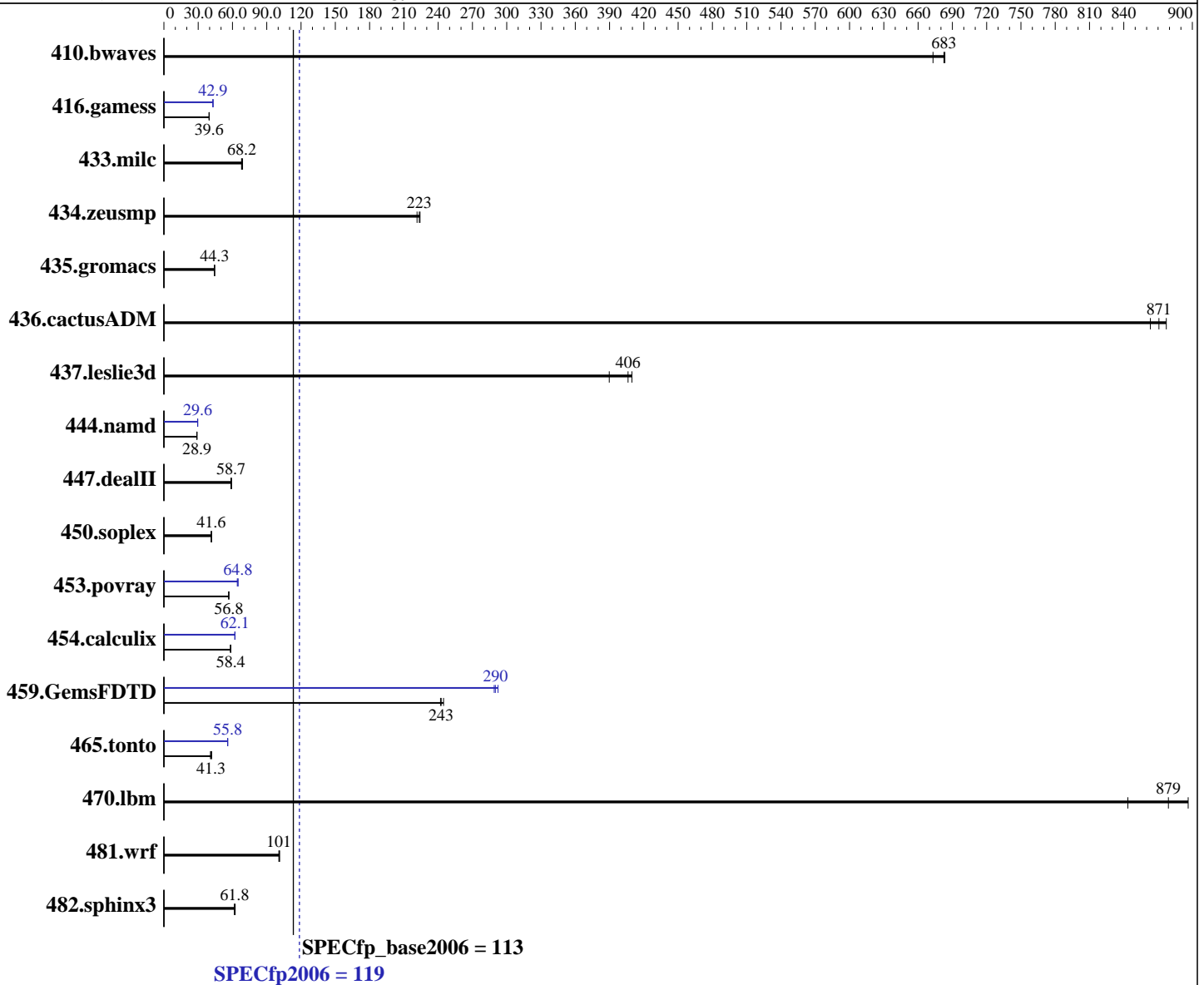
Test date: Aug-2017

Test sponsor: Lenovo Global Technology

Hardware Availability: Aug-2017

Tested by: Lenovo Global Technology

Software Availability: Nov-2016



**Hardware**

CPU Name: Intel Xeon Silver 4114  
 CPU Characteristics: Intel Turbo Boost Technology up to 3.00 GHz  
 CPU MHz: 2200  
 FPU: Integrated  
 CPU(s) enabled: 20 cores, 2 chips, 10 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 SP2 (x86\_64)  
 Kernel 4.4.21-69-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: 13.75 MB I+D on chip per chip  
Other Cache: None  
Memory: 384 GB (12 x 32 GB 2Rx4 PC4-2666V-R, running at 2400 MHz)  
Disk Subsystem: 1 x 800 GB SATA 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	19.9	683	20.2	673	<b>19.9</b>	<b>683</b>	19.9	683	20.2	673	<b>19.9</b>	<b>683</b>
416.gamess	<b>495</b>	<b>39.6</b>	495	39.6	495	39.6	456	42.9	<b>456</b>	<b>42.9</b>	456	42.9
433.milc	135	67.9	<b>135</b>	<b>68.2</b>	133	68.8	135	67.9	<b>135</b>	<b>68.2</b>	133	68.8
434.zeusmp	<b>40.7</b>	<b>223</b>	41.1	222	40.6	224	<b>40.7</b>	<b>223</b>	41.1	222	40.6	224
435.gromacs	161	44.3	<b>161</b>	<b>44.3</b>	161	44.4	161	44.3	<b>161</b>	<b>44.3</b>	161	44.4
436.cactusADM	13.8	863	<b>13.7</b>	<b>871</b>	13.6	877	13.8	863	<b>13.7</b>	<b>871</b>	13.6	877
437.leslie3d	<b>23.1</b>	<b>406</b>	23.0	410	24.1	390	<b>23.1</b>	<b>406</b>	23.0	410	24.1	390
444.namd	278	28.9	<b>278</b>	<b>28.9</b>	278	28.9	272	29.5	271	29.6	<b>271</b>	<b>29.6</b>
447.dealII	193	59.2	<b>195</b>	<b>58.7</b>	195	58.7	193	59.2	<b>195</b>	<b>58.7</b>	195	58.7
450.soplex	202	41.3	<b>200</b>	<b>41.6</b>	200	41.7	202	41.3	<b>200</b>	<b>41.6</b>	200	41.7
453.povray	93.8	56.7	93.6	56.8	<b>93.7</b>	<b>56.8</b>	<b>82.1</b>	<b>64.8</b>	82.9	64.2	82.0	64.9
454.calculix	141	58.6	<b>141</b>	<b>58.4</b>	142	58.2	133	62.1	<b>133</b>	<b>62.1</b>	133	62.2
459.GemsFDTD	43.4	245	<b>43.7</b>	<b>243</b>	43.8	242	36.7	289	36.3	292	<b>36.6</b>	<b>290</b>
465.tonto	<b>238</b>	<b>41.3</b>	235	41.8	242	40.7	176	55.9	176	55.8	<b>176</b>	<b>55.8</b>
470.lbm	15.3	896	<b>15.6</b>	<b>879</b>	16.3	844	15.3	896	<b>15.6</b>	<b>879</b>	16.3	844
481.wrf	110	101	111	101	<b>110</b>	<b>101</b>	110	101	111	101	<b>110</b>	<b>101</b>
482.sphinx3	312	62.4	<b>315</b>	<b>61.8</b>	316	61.7	312	62.4	<b>315</b>	<b>61.8</b>	316	61.7

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

Per Core P-state set to Disable

LLC dead line alloc set to Disable

Sysinfo program /home/cpu2006-1.2-ic17.0/config/sysinfo.rev6993

Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)

running on ST550 Sun Aug 27 01:35:01 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) Silver 4114 CPU @ 2.20GHz
 2 "physical id"s (chips)
 20 "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    : 10
  siblings     : 10
  physical 0   : cores 0 1 2 3 4 8 9 10 11 12
  physical 1   : cores 0 1 2 3 4 8 9 10 11 12
cache size     : 14080 KB

```

```

From /proc/meminfo
MemTotal:      395883768 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 ST550 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 26 20:50

```

SPEC is set to: /home/cpu2006-1.2-ic17.0
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sda2       btrfs 744G 172G 569G  24% /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 -[O0E105R-1.00]- 04/27/2017

Memory:

12x Hynix HMA84GR7AFR4N-VK 32 GB 2 rank 2666 MHz, configured at 2400 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-ic17.0/libs/32:/home/cpu2006-1.2-ic17.0/libs/64:/home/cpu2006-1.2-ic17.0/sh10.2"

OMP\_NUM\_THREADS = "20"

Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM  
memory using Redhat Enterprise Linux 7.2

Transparent Huge Pages enabled by default.

## 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

437.leslie3d: -DSPEC\_CPU\_LP64

444.namd: -DSPEC\_CPU\_LP64

447.dealII: -DSPEC\_CPU\_LP64

450.soplex: -DSPEC\_CPU\_LP64

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## Base Portability Flags (Continued)

```

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.html>

<http://www.spec.org/cpu2006/flags/Lenovo-Platform-Flags-V1.2-SKL-C.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.xml>

<http://www.spec.org/cpu2006/flags/Lenovo-Platform-Flags-V1.2-SKL-C.xml>

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

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