



# SPEC® CFP2006 Result

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## Lenovo Global Technology

ThinkSystem SR590  
(2.10 GHz, Intel Xeon Silver 4116)

**SPECfp®2006 = 121**

**SPECfp\_base2006 = 115**

CPU2006 license: 9017

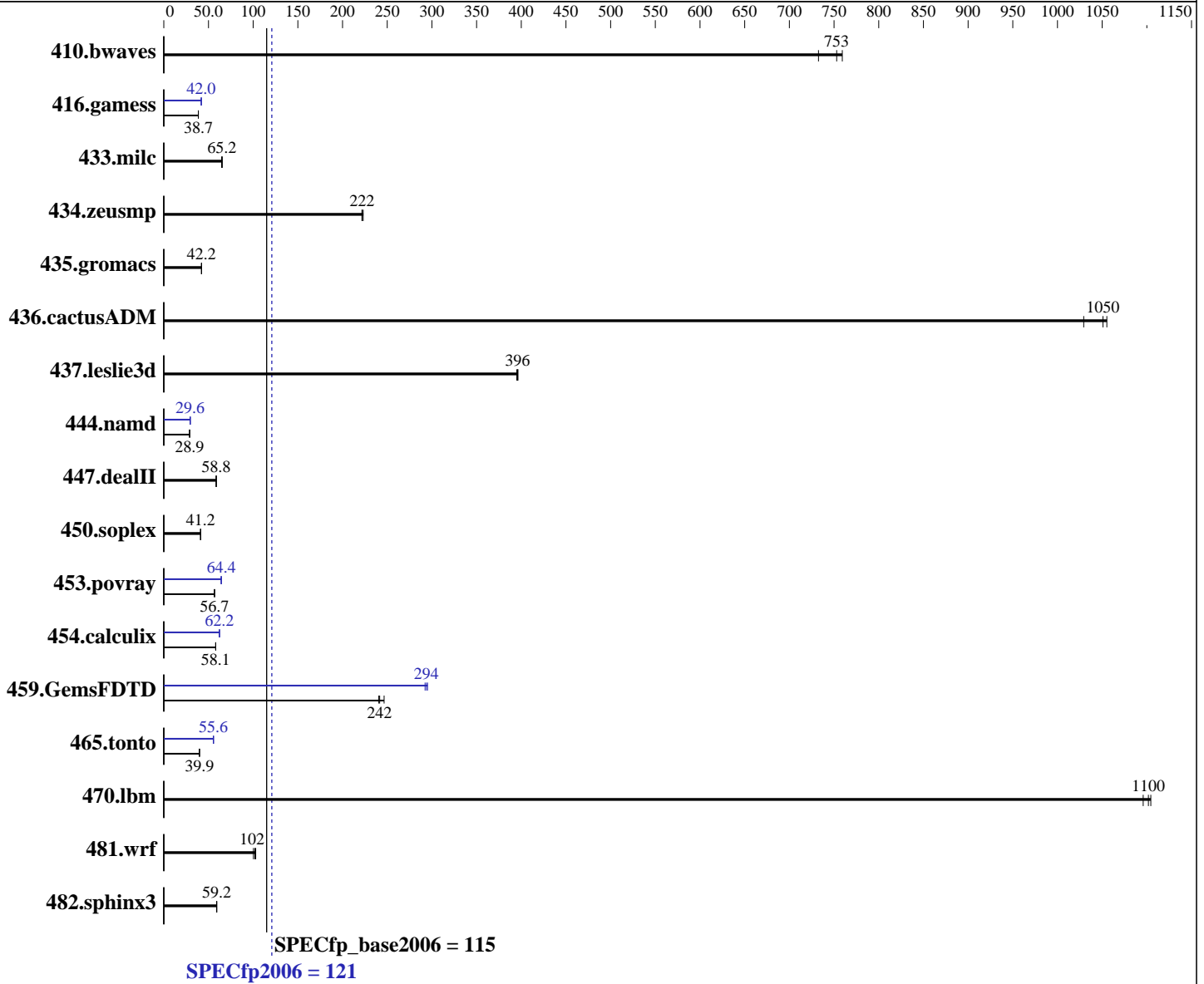
Test sponsor: Lenovo Global Technology

Tested by: Lenovo Global Technology

Test date: Nov-2017

Hardware Availability: Nov-2017

Software Availability: Sep-2017



**Hardware**

CPU Name: Intel Xeon Silver 4116  
 CPU Characteristics: Intel Turbo Boost Technology up to 3.00 GHz  
 CPU MHz: 2100  
 FPU: Integrated  
 CPU(s) enabled: 24 cores, 2 chips, 12 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: 16.5 MB I+D on chip per chip  
Other Cache: None  
Memory: 384 GB (12 x 32 GB 2Rx4 PC4-2666V-R, running at 2400)  
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	18.6	733	17.9	759	<b>18.0</b>	<b>753</b>	18.6	733	17.9	759	<b>18.0</b>	<b>753</b>
416.gamess	506	38.7	507	38.6	<b>507</b>	<b>38.7</b>	466	42.0	467	41.9	<b>467</b>	<b>42.0</b>
433.milc	142	64.7	<b>141</b>	<b>65.2</b>	140	65.3	142	64.7	<b>141</b>	<b>65.2</b>	140	65.3
434.zeusmp	<b>41.0</b>	<b>222</b>	41.0	222	40.8	223	<b>41.0</b>	<b>222</b>	41.0	222	40.8	223
435.gromacs	169	42.1	<b>169</b>	<b>42.2</b>	169	42.3	169	42.1	<b>169</b>	<b>42.2</b>	169	42.3
436.cactusADM	11.6	1030	11.3	1060	<b>11.4</b>	<b>1050</b>	11.6	1030	11.3	1060	<b>11.4</b>	<b>1050</b>
437.leslie3d	<b>23.7</b>	<b>396</b>	23.7	396	23.8	395	<b>23.7</b>	<b>396</b>	23.7	396	23.8	395
444.namd	278	28.9	278	28.9	<b>278</b>	<b>28.9</b>	271	29.6	271	29.6	<b>271</b>	<b>29.6</b>
447.dealII	196	58.4	<b>195</b>	<b>58.8</b>	194	58.8	196	58.4	<b>195</b>	<b>58.8</b>	194	58.8
450.soplex	203	41.1	<b>203</b>	<b>41.2</b>	203	41.2	203	41.1	<b>203</b>	<b>41.2</b>	203	41.2
453.povray	<b>93.8</b>	<b>56.7</b>	93.7	56.8	93.8	56.7	<b>82.7</b>	<b>64.4</b>	82.6	64.4	82.9	64.2
454.calculix	142	58.1	<b>142</b>	<b>58.1</b>	142	58.0	132	62.4	<b>133</b>	<b>62.2</b>	133	62.2
459.GemsFDTD	44.1	240	43.0	247	<b>43.9</b>	<b>242</b>	36.0	295	36.3	292	<b>36.1</b>	<b>294</b>
465.tonto	246	40.0	247	39.9	<b>247</b>	<b>39.9</b>	177	55.7	178	55.4	<b>177</b>	<b>55.6</b>
470.lbm	12.4	1100	12.5	1100	<b>12.5</b>	<b>1100</b>	12.4	1100	12.5	1100	<b>12.5</b>	<b>1100</b>
481.wrf	<b>110</b>	<b>102</b>	111	100	109	103	<b>110</b>	<b>102</b>	111	100	109	103
482.sphinx3	330	59.0	<b>329</b>	<b>59.2</b>	329	59.3	330	59.0	<b>329</b>	<b>59.2</b>	329	59.3

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

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### Platform Notes (Continued)

Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)  
running on SR590-2 Mon Nov 20 15:24:41 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) Silver 4116 CPU @ 2.10GHz
 2 "physical id"s (chips)
 24 "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 : 12
  siblings  : 12
  physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 13
  physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 13
cache size : 16896 KB

```

```

From /proc/meminfo
MemTotal:      395779220 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 SR590-2 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 20 15:24

```

SPEC is set to: /home/cpu2006-1.2-ic17.0
Filesystem      Type      Size  Used Avail Use% Mounted on
/dev/sdb2       btrfs    744G  103G  641G  14% /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 -[TEE119J-1.20]- 09/06/2017

Memory:

12x Hynix HMA84GR7AFR4N-VK 32 GB 2 rank 2666 MHz, configured at 2400 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 = "24"

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

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.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.xml>

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

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