



# SPEC® CFP2006 Result

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## Lenovo Global Technology

SPECfp®2006 = 102

ThinkSystem SR550  
(2.60 GHz, Intel Xeon Silver 4112)

SPECfp\_base2006 = 98.8

CPU2006 license: 9017

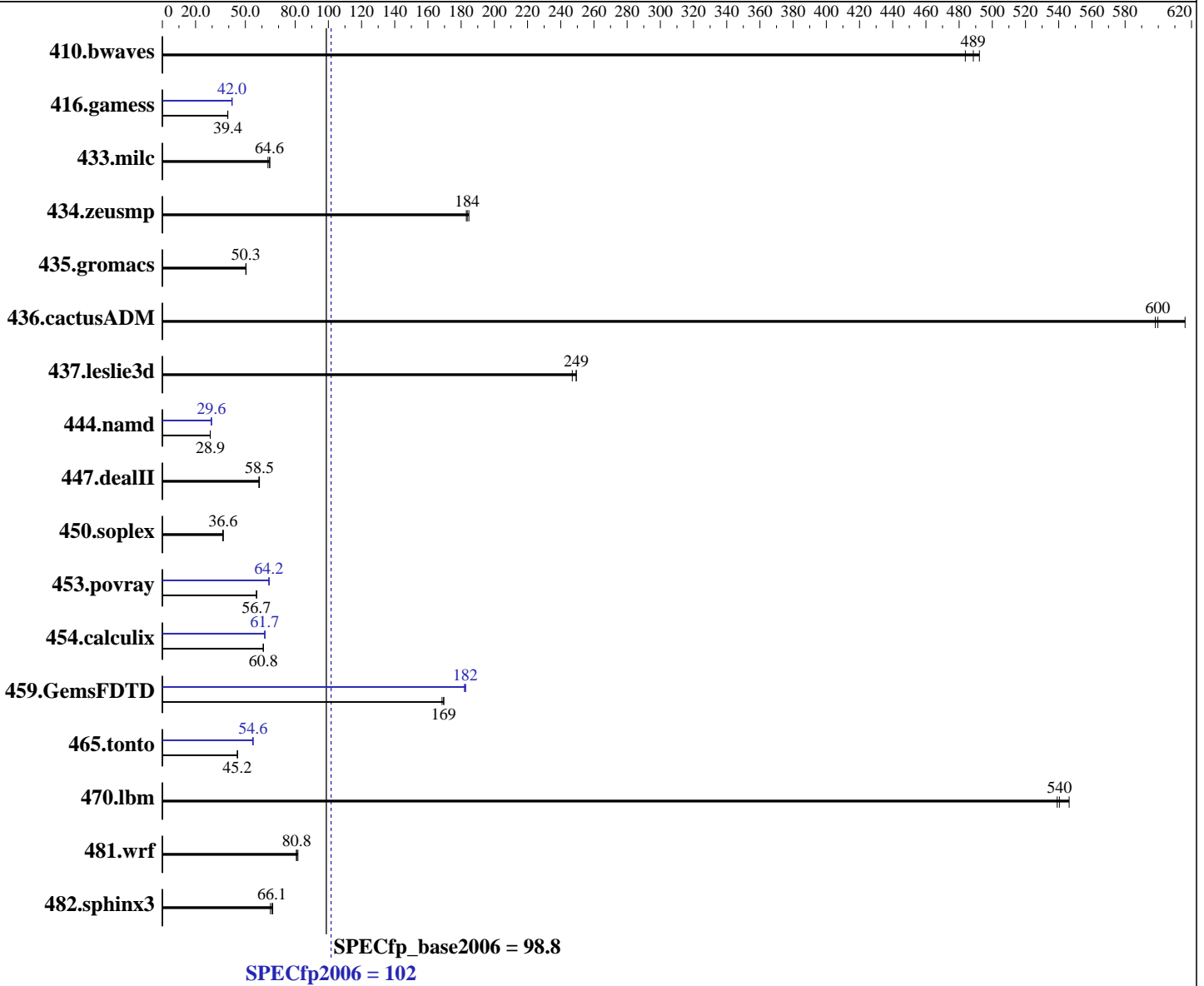
Test date: Jul-2017

Test sponsor: Lenovo Global Technology

Hardware Availability: Aug-2017

Tested by: Lenovo Global Technology

Software Availability: Nov-2016



| Hardware             |   |
|----------------------|---|
| CPU Name:            | Intel Xeon Silver 4112                      |
| CPU Characteristics: | Intel Turbo Boost Technology up to 3.00 GHz |
| CPU MHz:             | 2600  |
| FPU:                 | Integrated                                  |
| CPU(s) enabled:      | 8 cores, 2 chips, 4 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)<br>Kernel 4.4.21-69-default  |
| Compiler:         | C/C++: Version 17.0.0.098 of Intel C/C++<br>Compiler for Linux;<br>Fortran: Version 17.0.0.098 of Intel Fortran<br>Compiler for Linux |
| Auto Parallel:    | Yes   |
| File System:      | btrfs   |
| System State:     | Run level 3 (multi-user)  |

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L3 Cache: 8.25 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    | 27.6       | 492         | <b>27.8</b> | <b>489</b>  | 28.1        | 484         | 27.6        | 492         | <b>27.8</b> | <b>489</b>  | 28.1       | 484         |
| 416.gamess    | <b>497</b> | <b>39.4</b> | 498         | 39.3        | 497         | 39.4        | 466         | 42.0        | <b>466</b>  | <b>42.0</b> | 467        | 41.9        |
| 433.milc      | 144        | 63.6        | 142         | 64.7        | <b>142</b>  | <b>64.6</b> | 144         | 63.6        | 142         | 64.7        | <b>142</b> | <b>64.6</b> |
| 434.zeusmp    | 49.7       | 183         | <b>49.5</b> | <b>184</b>  | 49.3        | 185         | 49.7        | 183         | <b>49.5</b> | <b>184</b>  | 49.3       | 185         |
| 435.gromacs   | 142        | 50.3        | <b>142</b>  | <b>50.3</b> | 142         | 50.5        | 142         | 50.3        | <b>142</b>  | <b>50.3</b> | 142        | 50.5        |
| 436.cactusADM | 19.4       | 616         | <b>19.9</b> | <b>600</b>  | 20.0        | 598         | 19.4        | 616         | <b>19.9</b> | <b>600</b>  | 20.0       | 598         |
| 437.leslie3d  | 37.7       | 249         | <b>37.7</b> | <b>249</b>  | 38.1        | 247         | 37.7        | 249         | <b>37.7</b> | <b>249</b>  | 38.1       | 247         |
| 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    | <b>196</b> | <b>58.5</b> | 197         | 58.1        | 196         | 58.5        | <b>196</b>  | <b>58.5</b> | 197         | 58.1        | 196        | 58.5        |
| 450.soplex    | 229        | 36.4        | 227         | 36.7        | <b>228</b>  | <b>36.6</b> | 229         | 36.4        | 227         | 36.7        | <b>228</b> | <b>36.6</b> |
| 453.povray    | 93.6       | 56.9        | 93.9        | 56.7        | <b>93.8</b> | <b>56.7</b> | <b>82.8</b> | <b>64.2</b> | 82.9        | 64.2        | 82.7       | 64.3        |
| 454.calculix  | 136        | 60.8        | <b>136</b>  | <b>60.8</b> | 136         | 60.8        | 134         | 61.7        | 133         | 61.8        | <b>134</b> | <b>61.7</b> |
| 459.GemsFDTD  | 62.6       | 170         | <b>62.6</b> | <b>169</b>  | 63.0        | 168         | 58.1        | 183         | <b>58.2</b> | <b>182</b>  | 58.3       | 182         |
| 465.tonto     | 218        | 45.2        | 217         | 45.3        | <b>218</b>  | <b>45.2</b> | 180         | 54.7        | <b>180</b>  | <b>54.6</b> | 181        | 54.4        |
| 470.lbm       | 25.2       | 546         | <b>25.4</b> | <b>540</b>  | 25.5        | 539         | 25.2        | 546         | <b>25.4</b> | <b>540</b>  | 25.5       | 539         |
| 481.wrf       | 137        | 81.7        | 138         | 80.8        | <b>138</b>  | <b>80.8</b> | 137         | 81.7        | 138         | 80.8        | <b>138</b> | <b>80.8</b> |
| 482.sphinx3   | <b>295</b> | <b>66.1</b> | 293         | 66.5        | 299         | 65.1        | <b>295</b>  | <b>66.1</b> | 293         | 66.5        | 299        | 65.1        |

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:  
Operating Mode set to Maximum Performance  
Hyper-Threading set to Disabled  
Uncore Frequency Scaling 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 linux-yyst Sun Jul 30 21:53:58 2017

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**Software Availability:** Nov-2016

### 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 4112 CPU @ 2.60GHz
 2 "physical id"s (chips)
 8 "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 3 4
  physical 1   : cores 1 2 4 5
  cache size   : 8448 KB

```

```

From /proc/meminfo
MemTotal:      395883484 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 linux-yyt 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 30 21:50

```

SPEC is set to: /home/cpu2006-1.2-ic17.0
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sda2       btrfs 744G 256G 487G  35% /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 -[TEE105Z-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 = "8"

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

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

437.leslie3d: -DSPEC\_CPU\_LP64

444.namd: -DSPEC\_CPU\_LP64

447.dealII: -DSPEC\_CPU\_LP64

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## Base Portability Flags (Continued)

```

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.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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