



# SPEC<sup>®</sup> CFP2006 Result

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## Lenovo Group Limited

Lenovo ThinkServer TS460  
(3.70 GHz, Intel Xeon E3-1280 v5)

SPECfp<sup>®</sup>\_rate2006 = 194

SPECfp\_rate\_base2006 = 188

CPU2006 license: 9017

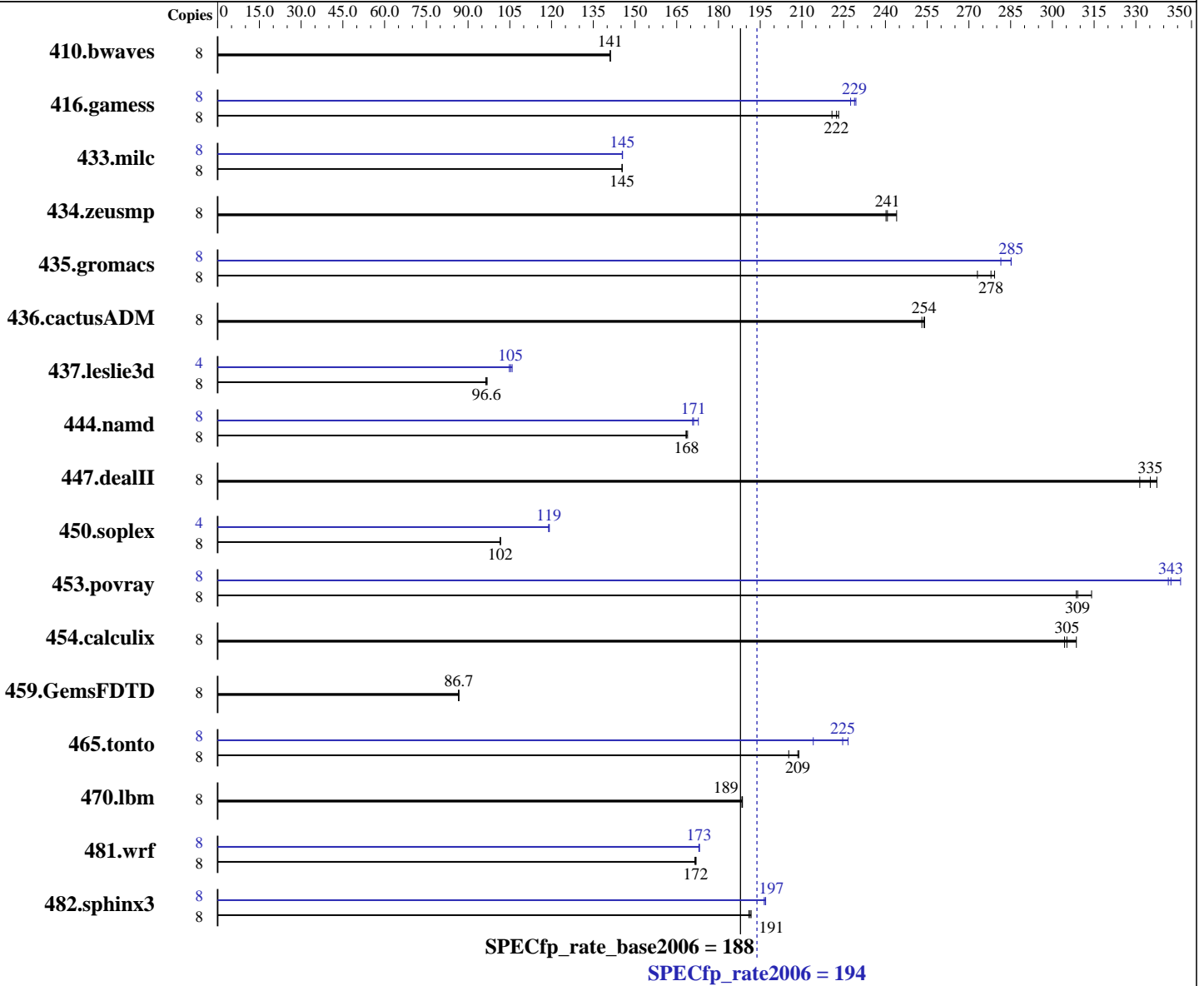
Test sponsor: Lenovo Group Limited

Tested by: Lenovo Group Limited

Test date: Jan-2017

Hardware Availability: Feb-2017

Software Availability: May-2016



### Hardware

CPU Name: Intel Xeon E3-1280 v5  
 CPU Characteristics: Intel Turbo Boost Technology up to 4.00 GHz  
 CPU MHz: 3700  
 FPU: Integrated  
 CPU(s) enabled: 4 cores, 1 chip, 4 cores/chip, 2 threads/core  
 CPU(s) orderable: 1 chip  
 Primary Cache: 32 KB I + 32 KB D on chip per core  
 Secondary Cache: 256 KB I+D on chip per core

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### Software

Operating System: Red Hat Enterprise Linux Server release 6.8 (Santiago)  
 Kernel 2.6.32-642.el6.x86\_64  
 Compiler: C/C++: Version 14.0.0.080 of Intel C++ Studio XE for Linux;  
 Fortran: Version 14.0.0.080 of Intel Fortran Studio XE for Linux  
 Auto Parallel: No  
 File System: ext4

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L3 Cache: 8 MB I+D on chip per chip  
Other Cache: None  
Memory: 16 GB (2 x 8 GB 2Rx8 PC4-2133P-E)  
Disk Subsystem: 1 x 800 GB SATA SSD  
Other Hardware: None

System State: Run level 3 (multi-user)  
Base Pointers: 32/64-bit  
Peak Pointers: 32/64-bit  
Other Software: None

## Results Table

| Benchmark     | Base   |            |            |            |             |            |            | Peak   |            |            |            |             |            |            |
|---------------|--------|------------|------------|------------|-------------|------------|------------|--------|------------|------------|------------|-------------|------------|------------|
|               | Copies | Seconds    | Ratio      | Seconds    | Ratio       | Seconds    | Ratio      | Copies | Seconds    | Ratio      | Seconds    | Ratio       | Seconds    | Ratio      |
| 410.bwaves    | 8      | <u>770</u> | <u>141</u> | 770        | 141         | 771        | 141        | 8      | <u>770</u> | <u>141</u> | 770        | 141         | 771        | 141        |
| 416.gamess    | 8      | 702        | 223        | 709        | 221         | <u>704</u> | <u>222</u> | 8      | 689        | 227        | <u>684</u> | <u>229</u>  | 683        | 229        |
| 433.milc      | 8      | 505        | 145        | 505        | 145         | <u>505</u> | <u>145</u> | 8      | 505        | 146        | <u>505</u> | <u>145</u>  | 505        | 145        |
| 434.zeusmp    | 8      | 298        | 244        | 303        | 240         | <u>302</u> | <u>241</u> | 8      | 298        | 244        | 303        | 240         | <u>302</u> | <u>241</u> |
| 435.gromacs   | 8      | 209        | 273        | 205        | 279         | <u>206</u> | <u>278</u> | 8      | <u>200</u> | <u>285</u> | 200        | 285         | 203        | 281        |
| 436.cactusADM | 8      | 376        | 254        | <u>377</u> | <u>254</u>  | 378        | 253        | 8      | 376        | 254        | <u>377</u> | <u>254</u>  | 378        | 253        |
| 437.leslie3d  | 8      | 780        | 96.4       | <u>778</u> | <u>96.6</u> | 776        | 96.9       | 4      | 355        | 106        | <u>357</u> | <u>105</u>  | 359        | 105        |
| 444.namd      | 8      | 381        | 168        | 380        | 169         | <u>381</u> | <u>168</u> | 8      | <u>375</u> | <u>171</u> | 371        | 173         | 376        | 171        |
| 447.dealII    | 8      | <u>273</u> | <u>335</u> | 276        | 331         | 271        | 338        | 8      | <u>273</u> | <u>335</u> | 276        | 331         | 271        | 338        |
| 450.soplex    | 8      | <u>657</u> | <u>102</u> | 657        | 102         | 656        | 102        | 4      | 280        | 119        | <u>280</u> | <u>119</u>  | 280        | 119        |
| 453.povray    | 8      | 138        | 309        | 136        | 314         | <u>138</u> | <u>309</u> | 8      | 123        | 346        | <u>124</u> | <u>343</u>  | 125        | 342        |
| 454.calculix  | 8      | 217        | 304        | 214        | 309         | <u>216</u> | <u>305</u> | 8      | 217        | 304        | 214        | 309         | <u>216</u> | <u>305</u> |
| 459.GemsFDTD  | 8      | 979        | 86.7       | <u>979</u> | <u>86.7</u> | 981        | 86.5       | 8      | 979        | 86.7       | <u>979</u> | <u>86.7</u> | 981        | 86.5       |
| 465.tonto     | 8      | 377        | 209        | 384        | 205         | <u>378</u> | <u>209</u> | 8      | 347        | 227        | 368        | 214         | <u>350</u> | <u>225</u> |
| 470.lbm       | 8      | 583        | 189        | <u>583</u> | <u>189</u>  | 583        | 188        | 8      | 583        | 189        | <u>583</u> | <u>189</u>  | 583        | 188        |
| 481.wrf       | 8      | 520        | 172        | <u>520</u> | <u>172</u>  | 521        | 172        | 8      | 517        | 173        | 516        | 173         | <u>516</u> | <u>173</u> |
| 482.sphinx3   | 8      | 813        | 192        | 817        | 191         | <u>815</u> | <u>191</u> | 8      | <u>792</u> | <u>197</u> | 792        | 197         | 794        | 196        |

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

## Submit Notes

The taskset mechanism was used to bind copies to processors. The config file option 'submit' was used to generate taskset commands to bind each copy to a specific processor. For details, please see the config file.

## Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"  
Transparent Huge Pages enabled with:  
echo always > /sys/kernel/mm/transparent\_hugepage/enabled  
Filesystem page cache cleared with:  
echo 1> /proc/sys/vm/drop\_caches



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**Hardware Availability:** Feb-2017

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**Software Availability:** May-2016

### Platform Notes

#### BIOS Configuration:

```
Boot performance mode set to Turbo Performance
Sysinfo program /home/cpu2006-ic14/config/sysinfo.rev6818
$Rev: 6818 $ $Date:: 2012-07-17 #$ e86d102572650a6e4d596a3cee98f191
running on TS460-01 Fri Jan 20 17:48:59 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) CPU E3-1280 v5 @ 3.70GHz
 1 "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  : 8
  physical 0: cores 0 1 2 3
cache size : 8192 KB
```

#### From /proc/meminfo

```
MemTotal:      16273840 kB
HugePages_Total:    0
Hugepagesize:    2048 kB
```

#### /usr/bin/lsb\_release -d

```
Red Hat Enterprise Linux Server release 6.8 (Santiago)
```

#### From /etc/\*release\* /etc/\*version\*

```
redhat-release: Red Hat Enterprise Linux Server release 6.8 (Santiago)
system-release: Red Hat Enterprise Linux Server release 6.8 (Santiago)
system-release-cpe: cpe:/o:redhat:enterprise_linux:6server:ga:server
```

#### uname -a:

```
Linux TS460-01 2.6.32-642.el6.x86_64 #1 SMP Wed Apr 13 00:51:26 EDT 2016
x86_64 x86_64 x86_64 GNU/Linux
```

#### run-level 3 Jan 20 09:36

#### SPEC is set to: /home/cpu2006-ic14

```
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sdal        ext4   50G   17G   31G  35% /
```

#### Additional information from dmidecode:

```
BIOS LENOVO TB1TS100 11/26/2016
Memory:
 2x      8 GB
 2x Not Specified Not Specified
 2x Samsung M391A1G43EB1-CPB 8 GB 2133 MHz 2 rank
```

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## Platform Notes (Continued)

(End of data from sysinfo program)

## General Notes

Environment variables set by runspec before the start of the run:

LD\_LIBRARY\_PATH = "/home/cpu2006-ic14/libs/32:/home/cpu2006-ic14/libs/64:/home/cpu2006-ic14/sh"

Binaries compiled on a system with 1x Core i7-860 CPU + 8GB  
memory using RedHat EL 6.4

## 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  
 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



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## Base Optimization Flags

C benchmarks:

-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32  
-ansi-alias -opt-mem-layout-trans=3

C++ benchmarks:

-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32  
-ansi-alias -opt-mem-layout-trans=3

Fortran benchmarks:

-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch

Benchmarks using both Fortran and C:

-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32  
-ansi-alias -opt-mem-layout-trans=3

## Peak Compiler Invocation

C benchmarks (except as noted below):

icc -m64

482.sphinx3: icc -m32

C++ benchmarks (except as noted below):

icpc -m64

450.soplex: icpc -m32

Fortran benchmarks:

ifort -m64

Benchmarks using both Fortran and C:

icc -m64 ifort -m64

## Peak 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.deallI: -DSPEC\_CPU\_LP64  
453.povray: -DSPEC\_CPU\_LP64

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## Peak Portability Flags (Continued)

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

## Peak Optimization Flags

C benchmarks:

433.milc: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)  
 -O3(pass 2) -no-prec-div(pass 2)  
 -opt-mem-layout-trans=3(pass 2) -prof-use(pass 2)  
 -auto-ilp32

470.lbm: basepeak = yes

482.sphinx3: -xCORE-AVX2 -ipo -O3 -no-prec-div -opt-mem-layout-trans=3  
 -unroll2

C++ benchmarks:

444.namd: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)  
 -O3(pass 2) -no-prec-div(pass 2)  
 -opt-mem-layout-trans=3(pass 2) -prof-use(pass 2) -fno-alias  
 -auto-ilp32

447.dealII: basepeak = yes

450.soplex: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)  
 -O3(pass 2) -no-prec-div(pass 2)  
 -opt-mem-layout-trans=3(pass 2) -prof-use(pass 2)  
 -opt-malloc-options=3

453.povray: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)  
 -O3(pass 2) -no-prec-div(pass 2)  
 -opt-mem-layout-trans=3(pass 2) -prof-use(pass 2) -unroll4  
 -ansi-alias

Fortran benchmarks:

410.bwaves: basepeak = yes

416.gamess: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)  
 -O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2) -unroll2  
 -inline-level=0 -scalar-rep-

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## Peak Optimization Flags (Continued)

434.zeusmp: basepeak = yes

437.leslie3d: -xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch

459.GemsFDTD: basepeak = yes

465.tonto: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)  
-O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2) -unroll4  
-auto -inline-alloc -opt-malloc-options=3

Benchmarks using both Fortran and C:

435.gromacs: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)  
-O3(pass 2) -no-prec-div(pass 2)  
-opt-mem-layout-trans=3(pass 2) -prof-use(pass 2)  
-opt-prefetch -auto-ilp32

436.cactusADM: basepeak = yes

454.calculix: basepeak = yes

481.wrf: -xCORE-AVX2 -ipo -O3 -no-prec-div -auto-ilp32

The flags files that were used to format this result can be browsed at

<http://www.spec.org/cpu2006/flags/Intel-ic14.0-official-linux64.20140128.html>  
<http://www.spec.org/cpu2006/flags/Lenovo-Platform-Settings-V1.2-BDW-revE.html>

You can also download the XML flags sources by saving the following links:

<http://www.spec.org/cpu2006/flags/Intel-ic14.0-official-linux64.20140128.xml>  
<http://www.spec.org/cpu2006/flags/Lenovo-Platform-Settings-V1.2-BDW-revE.xml>

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For questions about this result, please contact the tester.  
For other inquiries, please contact [webmaster@spec.org](mailto:webmaster@spec.org).

Tested with SPEC CPU2006 v1.2.  
Report generated on Tue Feb 7 17:01:05 2017 by SPEC CPU2006 PS/PDF formatter v6932.  
Originally published on 7 February 2017.