



# SPEC<sup>®</sup> CFP2006 Result

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## Lenovo Group Limited

SPECfp<sup>®</sup>2006 = **95.9**

Lenovo ThinkServer TS460  
(3.50 GHz, Intel Xeon E3-1240 v5)

SPECfp\_base2006 = **93.8**

CPU2006 license: 9017

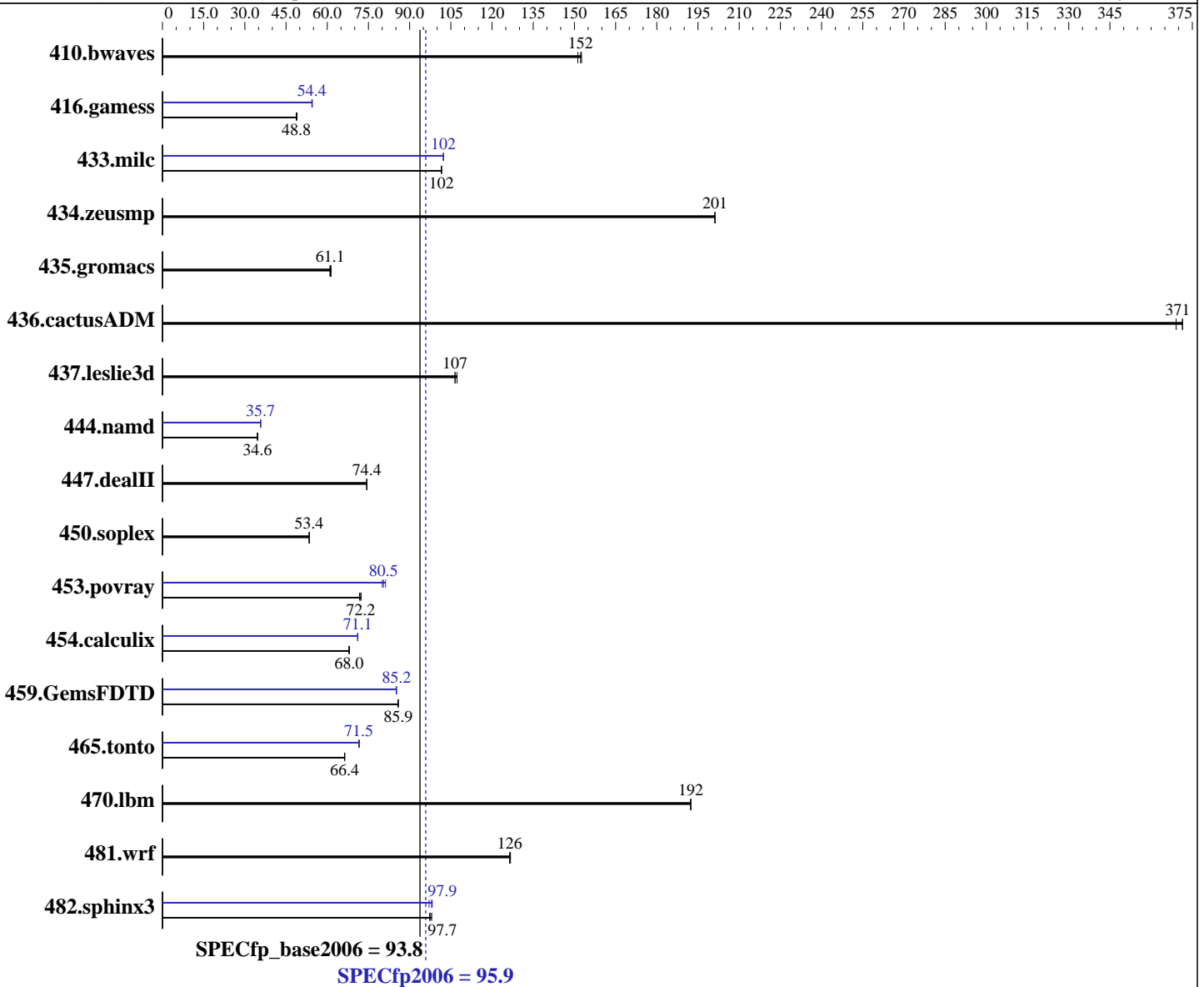
Test date: Feb-2017

Test sponsor: Lenovo Group Limited

Hardware Availability: Feb-2017

Tested by: Lenovo Group Limited

Software Availability: May-2016



### Hardware

CPU Name: Intel Xeon E3-1240 v5  
 CPU Characteristics: Intel Turbo Boost Technology up to 3.90 GHz  
 CPU MHz: 3500  
 FPU: Integrated  
 CPU(s) enabled: 4 cores, 1 chip, 4 cores/chip  
 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: Yes  
 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: 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	89.9	151	89.1	153	<b>89.3</b>	<b>152</b>	89.9	151	89.1	153	<b>89.3</b>	<b>152</b>
416.gamess	<b>401</b>	<b>48.8</b>	400	49.0	402	48.7	<b>360</b>	<b>54.4</b>	360	54.4	359	54.6
433.milc	90.3	102	90.4	102	<b>90.4</b>	<b>102</b>	89.8	102	89.7	102	<b>89.7</b>	<b>102</b>
434.zeusmp	45.2	201	45.2	201	<b>45.2</b>	<b>201</b>	45.2	201	45.2	201	<b>45.2</b>	<b>201</b>
435.gromacs	<b>117</b>	<b>61.1</b>	116	61.4	117	61.0	<b>117</b>	<b>61.1</b>	116	61.4	117	61.0
436.cactusADM	<b>32.2</b>	<b>371</b>	32.2	371	32.4	369	<b>32.2</b>	<b>371</b>	32.2	371	32.4	369
437.leslie3d	<b>88.2</b>	<b>107</b>	88.2	107	87.6	107	<b>88.2</b>	<b>107</b>	88.2	107	87.6	107
444.namd	<b>232</b>	<b>34.6</b>	232	34.6	231	34.6	224	35.7	224	35.8	<b>224</b>	<b>35.7</b>
447.dealII	154	74.4	<b>154</b>	<b>74.4</b>	154	74.4	154	74.4	<b>154</b>	<b>74.4</b>	154	74.4
450.soplex	156	53.4	156	53.5	<b>156</b>	<b>53.4</b>	156	53.4	156	53.5	<b>156</b>	<b>53.4</b>
453.povray	74.2	71.7	<b>73.7</b>	<b>72.2</b>	73.6	72.3	66.5	80.1	65.5	81.2	<b>66.1</b>	<b>80.5</b>
454.calculix	121	68.1	<b>121</b>	<b>68.0</b>	122	67.9	116	71.1	116	71.1	<b>116</b>	<b>71.1</b>
459.GemsFDTD	124	85.9	<b>124</b>	<b>85.9</b>	124	85.7	125	85.1	124	85.2	<b>125</b>	<b>85.2</b>
465.tonto	148	66.3	<b>148</b>	<b>66.4</b>	148	66.4	137	71.7	<b>138</b>	<b>71.5</b>	138	71.5
470.lbm	<b>71.4</b>	<b>192</b>	71.4	192	71.4	192	<b>71.4</b>	<b>192</b>	71.4	192	71.4	192
481.wrf	88.1	127	88.4	126	<b>88.3</b>	<b>126</b>	88.1	127	88.4	126	<b>88.3</b>	<b>126</b>
482.sphinx3	199	98.0	200	97.3	<b>200</b>	<b>97.7</b>	198	98.2	201	97.1	<b>199</b>	<b>97.9</b>

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"  
Transparent Huge Pages disabled with:  
echo never > /sys/kernel/mm/transparent\_hugepage/enabled

## Platform Notes

BIOS Configuration:  
Boot performance mode set to Turbo Performance  
Hyper-Threading set to Disabled  
CPU C3 State Support set to Disabled  
CPU C6 State Support set to Disabled  
CPU C7 State Support set to Enabled  
Package C State Support set to C7  
No-Execute Memory Protection set to Disabled

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### Platform Notes (Continued)

Intel Virtualization Technology set to Disabled  
CPU Thermal Throttling set to Disabled  
Sysinfo program /home/cpu2006-ic14/config/sysinfo.rev6818  
\$Rev: 6818 \$ \$Date:: 2012-07-17 #\$ e86d102572650a6e4d596a3cee98f191  
running on TS460-01 Wed Feb 15 07:34:09 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 E3-1240 v5 @ 3.50GHz
 1 "physical id"s (chips)
 4 "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 0 1 2 3
cache size : 8192 KB
```

```
From /proc/meminfo
MemTotal:      16274480 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 Feb 15 02:47
```

```
SPEC is set to: /home/cpu2006-ic14
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sdal       ext4   50G   17G   31G  36% /
```

```
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:

KMP\_AFFINITY = "granularity=fine,compact,1,0"

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

OMP\_NUM\_THREADS = "4"

Binaries compiled on a system with 1x Core i7-860 CPU + 8GB

memory using RedHat EL 6.4

runspec command invoked through numactl i.e.:

numactl --interleave=all runspec <etc>

## 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

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## Base Portability Flags (Continued)

482.sphinx3: -DSPEC\_CPU\_LP64

## Base Optimization Flags

C benchmarks:

-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -opt-prefetch  
-ansi-alias

C++ benchmarks:

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

Fortran benchmarks:

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

Benchmarks using both Fortran and C:

-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -opt-prefetch  
-ansi-alias

## 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

## 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) -prof-use(pass 2)  
-auto-ilp32 -ansi-alias

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## Peak Optimization Flags (Continued)

470.lbm: basepeak = yes

482.sphinx3: -xCORE-AVX2 -ipo -O3 -no-prec-div -unroll2 -ansi-alias  
-parallel

C++ benchmarks:

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

447.dealIII: basepeak = yes

450.soplex: basepeak = yes

453.povray: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)  
-O3(pass 2) -no-prec-div(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-

434.zeusmp: basepeak = yes

437.leslie3d: basepeak = yes

459.GemsFDTD: -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 -opt-prefetch -parallel

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)  
-inline-calloc -opt-malloc-options=3 -auto -unroll4

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 -ansi-alias

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## Peak Optimization Flags (Continued)

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-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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