



SPEC® CFP2006 Result

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Lenovo Group Limited

Lenovo ThinkServer TS460
(3.60 GHz, Intel Xeon E3-1270 v5)

SPECfp®2006 = 97.4

SPECfp_base2006 = 95.4

CPU2006 license: 9017

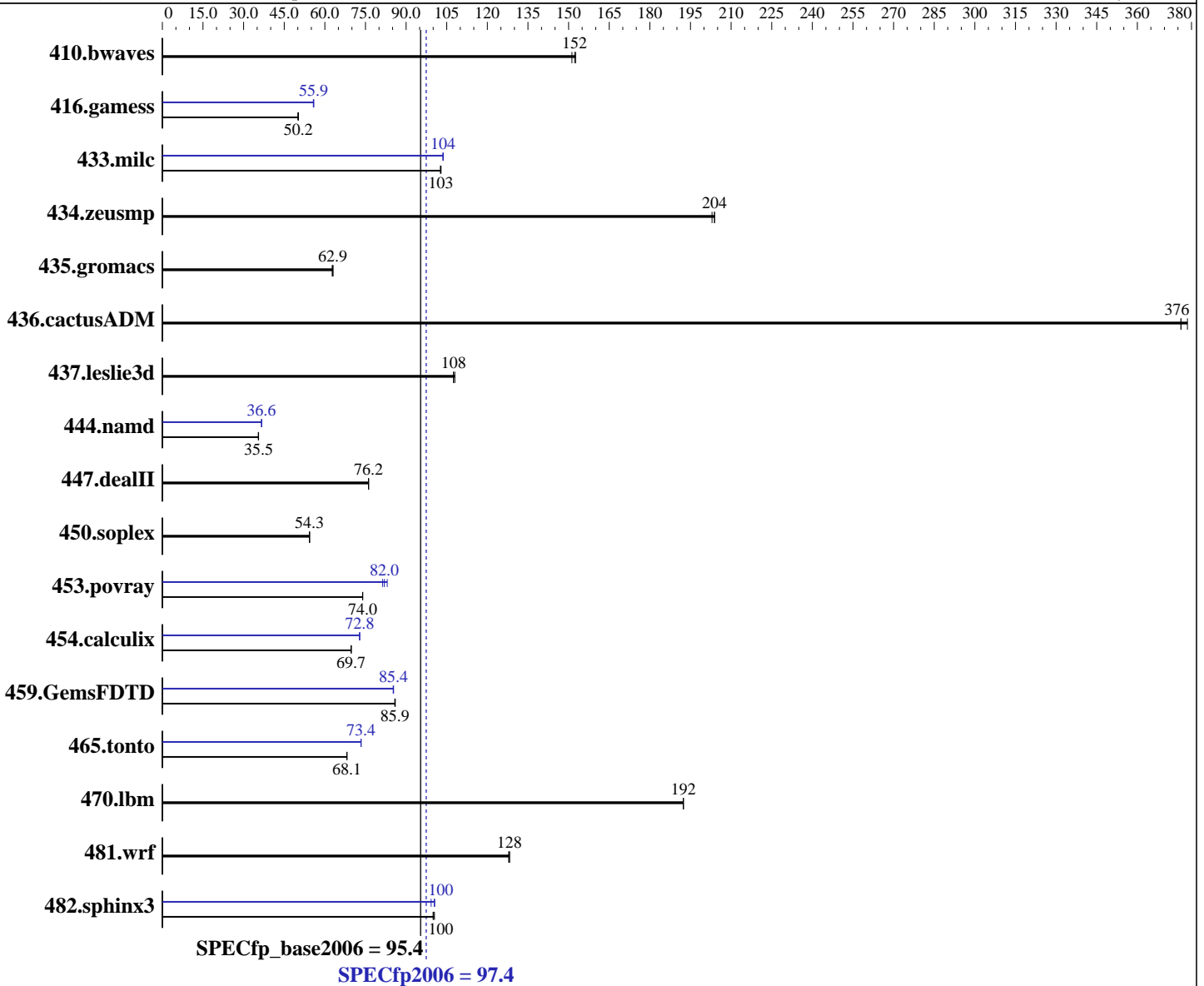
Test sponsor: Lenovo Group Limited

Tested by: Lenovo Group Limited

Test date: Feb-2017

Hardware Availability: Feb-2017

Software Availability: May-2016



Hardware

CPU Name: Intel Xeon E3-1270 v5
 CPU Characteristics: Intel Turbo Boost Technology up to 4.00 GHz
 CPU MHz: 3600
 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 | 89.3 | 152 | 89.1 | 153 | 89.9 | 151 | 89.3 | 152 | 89.1 | 153 | 89.9 | 151 |
| 416.gamess | 391 | 50.0 | 390 | 50.3 | 390 | 50.2 | 350 | 55.9 | 350 | 55.9 | 351 | 55.7 |
| 433.milc | 89.4 | 103 | 89.2 | 103 | 89.4 | 103 | 88.5 | 104 | 88.5 | 104 | 88.6 | 104 |
| 434.zeusmp | 44.6 | 204 | 44.6 | 204 | 44.8 | 203 | 44.6 | 204 | 44.6 | 204 | 44.8 | 203 |
| 435.gromacs | 114 | 62.7 | 113 | 62.9 | 113 | 63.0 | 114 | 62.7 | 113 | 62.9 | 113 | 63.0 |
| 436.cactusADM | 31.8 | 376 | 31.8 | 376 | 31.6 | 378 | 31.8 | 376 | 31.8 | 376 | 31.6 | 378 |
| 437.leslie3d | 87.4 | 108 | 87.4 | 108 | 87.0 | 108 | 87.4 | 108 | 87.4 | 108 | 87.0 | 108 |
| 444.namd | 226 | 35.5 | 226 | 35.5 | 227 | 35.4 | 219 | 36.7 | 219 | 36.6 | 219 | 36.6 |
| 447.dealII | 150 | 76.2 | 150 | 76.2 | 150 | 76.1 | 150 | 76.2 | 150 | 76.2 | 150 | 76.1 |
| 450.soplex | 154 | 54.3 | 153 | 54.3 | 153 | 54.3 | 154 | 54.3 | 153 | 54.3 | 153 | 54.3 |
| 453.povray | 71.9 | 74.0 | 71.9 | 74.0 | 72.0 | 73.9 | 64.1 | 83.0 | 65.4 | 81.3 | 64.9 | 82.0 |
| 454.calculix | 118 | 69.7 | 118 | 69.7 | 118 | 69.7 | 113 | 72.8 | 113 | 72.8 | 113 | 72.9 |
| 459.GemsFDTD | 123 | 86.0 | 124 | 85.9 | 124 | 85.9 | 124 | 85.4 | 124 | 85.4 | 125 | 85.2 |
| 465.tonto | 144 | 68.2 | 144 | 68.1 | 144 | 68.1 | 134 | 73.3 | 134 | 73.4 | 134 | 73.4 |
| 470.lbm | 71.4 | 192 | 71.4 | 192 | 71.4 | 192 | 71.4 | 192 | 71.4 | 192 | 71.4 | 192 |
| 481.wrf | 87.1 | 128 | 87.4 | 128 | 87.1 | 128 | 87.1 | 128 | 87.4 | 128 | 87.1 | 128 |
| 482.sphinx3 | 194 | 100 | 195 | 100 | 195 | 100 | 194 | 101 | 194 | 100 | 196 | 99.2 |

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 Fri Feb 17 07:02:51 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 E3-1270 v5 @ 3.60GHz
 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 17 02:53
```

```
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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