SPEC® CFP2006 Result

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Lenovo Group Limited

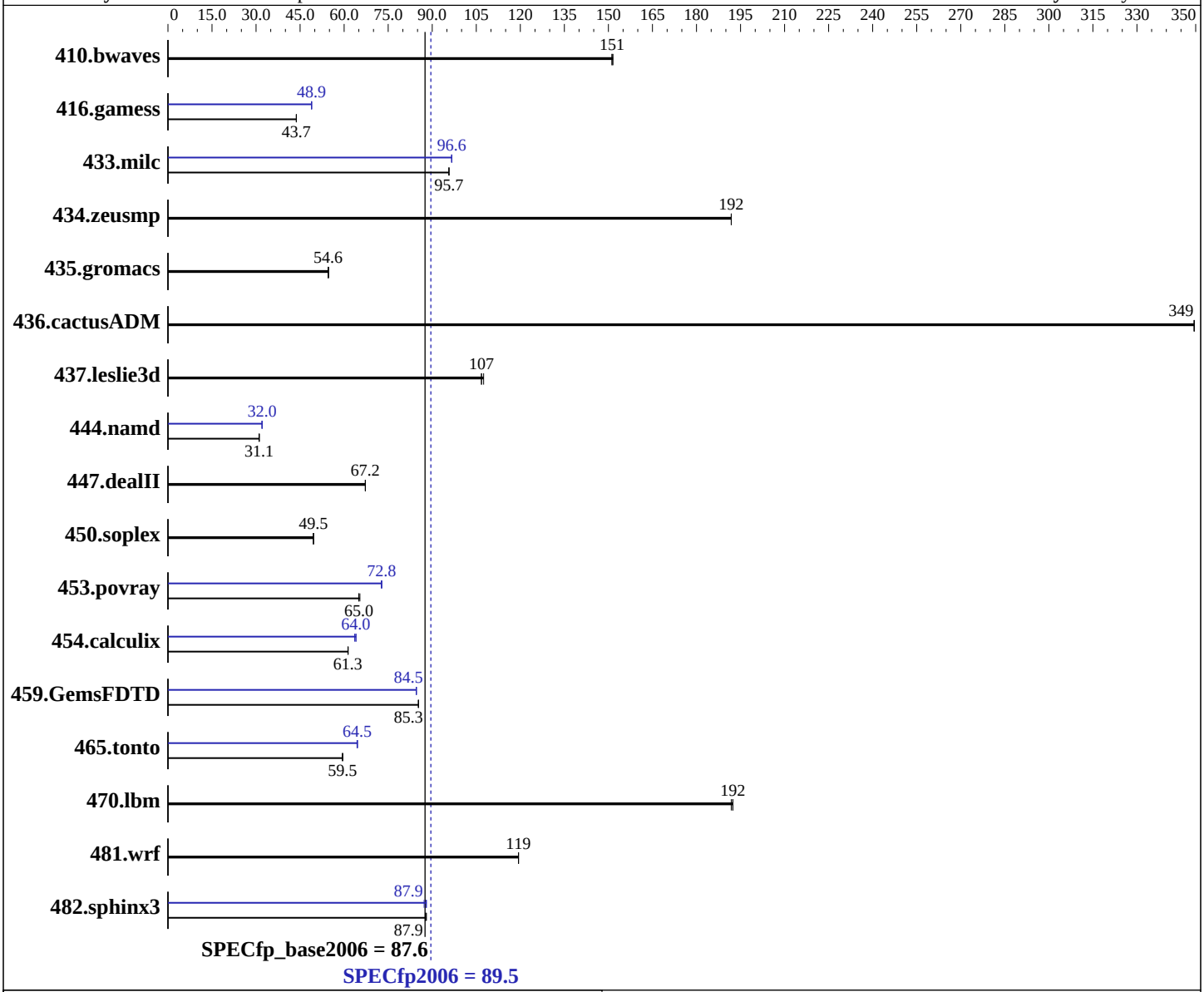
Lenovo ThinkServer TS460
(3.00 GHz, Intel Xeon E3-1220 v5)

SPECfp®2006 = 89.5

SPECfp_base2006 = 87.6

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 E3-1220 v5
CPU Characteristics:	Intel Turbo Boost Technology up to 3.50 GHz
CPU MHz:	3000
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**	89.9	151	89.7	152	**89.9**	**151**	89.9	151	89.7	152
416.gamess	**448**	**43.7**	448	43.7	448	43.7	400	49.0	**400**	**48.9**	401	48.9
433.milc	**95.9**	**95.7**	95.9	95.7	95.9	95.7	95.0	96.7	**95.0**	**96.6**	95.0	96.6
434.zeusmp	**47.4**	**192**	47.4	192	47.4	192	**47.4**	**192**	47.4	192	47.4	192
435.gromacs	**131**	**54.6**	130	54.7	131	54.6	**131**	**54.6**	130	54.7	131	54.6
436.cactusADM	34.2	349	**34.2**	**349**	34.2	350	34.2	349	**34.2**	**349**	34.2	350
437.leslie3d	88.0	107	87.4	108	**88.0**	**107**	88.0	107	87.4	108	**88.0**	**107**
444.namd	**258**	**31.1**	258	31.1	259	31.0	250	32.1	**250**	**32.0**	251	32.0
447.dealII	170	67.2	170	67.2	**170**	**67.2**	170	67.2	170	67.2	**170**	**67.2**
450.soplex	168	49.5	168	49.6	**168**	**49.5**	168	49.5	168	49.6	**168**	**49.5**
453.povray	**81.8**	**65.0**	81.4	65.4	81.9	65.0	73.1	72.8	73.2	72.6	**73.1**	**72.8**
454.calculix	**135**	**61.3**	134	61.4	135	61.3	129	64.0	**129**	**64.0**	130	63.6
459.GemsFDTD	124	85.3	**124**	**85.3**	124	85.3	**126**	**84.5**	126	84.5	125	84.7
465.tonto	166	59.4	165	59.5	**165**	**59.5**	152	64.6	153	64.4	**153**	**64.5**
470.lbm	71.6	192	71.4	192	**71.4**	**192**	71.6	192	71.4	192	**71.4**	**192**
481.wrf	93.6	119	93.6	119	**93.6**	**119**	93.6	119	93.6	119	**93.6**	**119**
482.sphinx3	221	88.0	**222**	**87.9**	222	87.6	**222**	**87.9**	221	88.0	223	87.2

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 Throtting set to Disabled
Sysinfo program /home/cpu2006-ic14/config/sysinfo.rev6818
$Rev: 6818 $ $Date:: 2012-07-17 #$ e86d102572650a6e4d596a3cee98f191
running on TS460-01 Mon Feb  6 14:53:40 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 E3-1220 v5 @ 3.00GHz
      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 6 10:12

SPEC is set to: /home/cpu2006-ic14
   Filesystem     Type  Size  Used Avail Use% Mounted on
   /dev/sda1      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

Continued on next page

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.dealII: 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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For other inquiries, please contact webmaster@spec.org.

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