SPEC® CFP2006 Result
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Lenovo Global Technology

$SPECfp®2006 =$ 106

Lenovo ThinkServer TS150
(3.70 GHz, Intel Xeon E3-1245 v6)

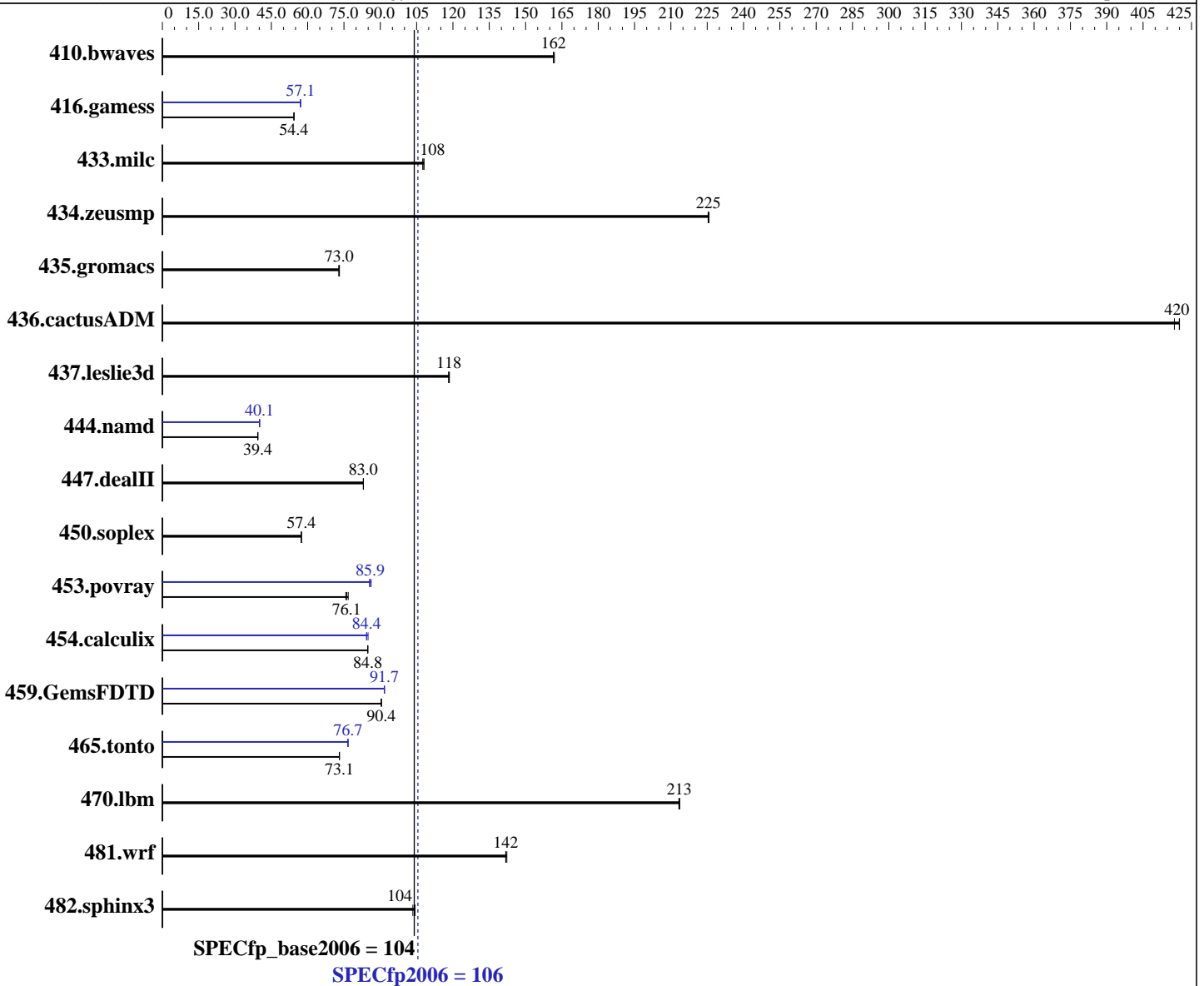$SPECfp\_base2006 =$ 104

CPU2006 license: 9017
Test sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology

Test date: Jul-2017
Hardware Availability: Apr-2017
Software Availability: Apr-2017

Benchmark	Result
410.bwaves	162
416.gamess	57.1 / 54.4
433.milc	108
434.zeusmp	225
435.gromacs	73.0
436.cactusADM	420
437.leslie3d	118
444.namd	40.1 / 39.4
447.dealII	83.0
450.soplex	57.4
453.povray	85.9 / 76.1
454.calculix	84.4 / 84.8
459.GemsFDTD	91.7 / 90.4
465.tonto	76.7 / 73.1
470.lbm	213
481.wrf	142
482.sphinx3	104

SPECfp_base2006 = 104
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Hardware

CPU Name: Intel Xeon E3-1245 v6
CPU Characteristics: Intel Turbo Boost Technology up to 4.10 GHz
CPU MHz: 3700
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

Continued on next page

Software

Operating System: Red Hat Enterprise Linux Server release 7.3 (Maipo)
Kernel 3.10.0-514.el7.x86_64
Compiler: C/C++: Version 17.0.3.191 of Intel C/C++ Compiler for Linux;
Fortran: Version 17.0.3.191 of Intel Fortran Compiler for Linux
Auto Parallel: Yes
File System: xfs

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L3 Cache:	8 MB I+D on chip per chip	System State:	Run level 3 (multi-user)
Other Cache:	None	Base Pointers:	64-bit
Memory:	64 GB (4 x 16 GB 2Rx8 PC4-2400T-U)	Peak Pointers:	32/64-bit
Disk Subsystem:	1 x 800 GB SATA SSD	Other Software:	None
Other Hardware:	None		

Results Table

Benchmark	Base						Peak					
	Seconds	**Ratio**	**Seconds**	**Ratio**	**Seconds**	**Ratio**	**Seconds**	**Ratio**	**Seconds**	**Ratio**	**Seconds**	**Ratio**
410.bwaves	83.9	162	84.2	161	**84.1**	**162**	83.9	162	84.2	161	**84.1**	**162**
416.gamess	360	54.4	360	54.3	**360**	**54.4**	343	57.1	**343**	**57.1**	343	57.0
433.milc	85.3	108	84.9	108	**85.3**	**108**	85.3	108	84.9	108	**85.3**	**108**
434.zeusmp	40.4	225	40.3	226	**40.4**	**225**	40.4	225	40.3	226	**40.4**	**225**
435.gromacs	97.6	73.1	**97.8**	**73.0**	98.0	72.8	97.6	73.1	**97.8**	**73.0**	98.0	72.8
436.cactusADM	28.6	418	**28.5**	**420**	28.4	420	28.6	418	**28.5**	**420**	28.4	420
437.leslie3d	79.5	118	**79.5**	**118**	79.3	119	79.5	118	**79.5**	**118**	79.3	119
444.namd	**203**	**39.4**	203	39.5	204	39.4	**200**	**40.1**	199	40.2	200	40.1
447.dealII	**138**	**83.0**	138	83.1	138	83.0	**138**	**83.0**	138	83.1	138	83.0
450.soplex	145	57.4	**145**	**57.4**	145	57.4	145	57.4	**145**	**57.4**	145	57.4
453.povray	69.3	76.7	70.2	75.7	**69.9**	**76.1**	**62.0**	**85.9**	62.2	85.5	61.7	86.2
454.calculix	97.2	84.8	97.3	84.8	**97.3**	**84.8**	97.1	85.0	**97.7**	**84.4**	97.9	84.3
459.GemsFDTD	**117**	**90.4**	117	90.5	117	90.4	116	91.7	**116**	**91.7**	116	91.7
465.tonto	135	73.1	135	73.1	**135**	**73.1**	128	76.6	**128**	**76.7**	128	76.7
470.lbm	64.3	214	**64.4**	**213**	64.4	213	64.3	214	**64.4**	**213**	64.4	213
481.wrf	78.5	142	**78.8**	**142**	78.8	142	78.5	142	**78.8**	**142**	78.8	142
482.sphinx3	187	104	**187**	**104**	188	103	187	104	**187**	**104**	188	103

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:
   Intel Hyper-Threading Technology set to Disabled
   Intel Virtualization Technology set to Enabled
   VT-d set to Enabled
   ICE Performance Mode set to Full Speed
    Sysinfo program /home/cpu2006-1.2-ic17.0u3/config/sysinfo.rev6993
    Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
    running on localhost.localdomain Tue Jul 25 20:44:12 2017

    This section contains SUT (System Under Test) info as seen by
```

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Platform Notes (Continued)

```
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 E3-1245 v6 @ 3.70GHz
      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:       65910656 kB
   HugePages_Total:       0
   Hugepagesize:       2048 kB

From /etc/*release* /etc/*version*
   os-release:
      NAME="Red Hat Enterprise Linux Server"
      VERSION="7.3 (Maipo)"
      ID="rhel"
      ID_LIKE="fedora"
      VERSION_ID="7.3"
      PRETTY_NAME="Red Hat Enterprise Linux Server 7.3 (Maipo)"
      ANSI_COLOR="0;31"
      CPE_NAME="cpe:/o:redhat:enterprise_linux:7.3:GA:server"
   redhat-release: Red Hat Enterprise Linux Server release 7.3 (Maipo)
   system-release: Red Hat Enterprise Linux Server release 7.3 (Maipo)
   system-release-cpe: cpe:/o:redhat:enterprise_linux:7.3:ga:server

uname -a:
   Linux localhost.localdomain 3.10.0-514.el7.x86_64 #1 SMP Wed Oct 19 11:24:13
   EDT 2016 x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Jul 25 16:43

SPEC is set to: /home/cpu2006-1.2-ic17.0u3
   Filesystem     Type  Size  Used Avail Use% Mounted on
   /dev/sda4      xfs   693G   11G  683G   2% /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
   determined", but the intent may not be met, as there are frequent changes to
   hardware, firmware, and the "DMTF SMBIOS" standard.

   BIOS LENOVO S06KT03A 02/07/2017
   Memory:
```

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Platform Notes (Continued)

```
    4x Samsung M378A2K43BB1-CRC 16 GB 2 rank 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-ic17.0u3/lib/ia32:/home/cpu2006-1.2-ic17.0u3/lib/intel64:/home/cpu2006-1.2-ic17.0u3/sh10.2"
OMP_NUM_THREADS = "4"

 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
 Filesystem page cache cleared with:
 shell invocation of 'sync; echo 3 > /proc/sys/vm/drop_caches' prior to run
```

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
```

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Base Portability Flags (Continued)

```
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
```

Peak Optimization Flags

C benchmarks:

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Peak Optimization Flags (Continued)

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

   454.calculix: `-xCORE-AVX2 -ipo -O3 -no-prec-div -auto-ilp32`

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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-ic17.0-official-linux64-revF.html
http://www.spec.org/cpu2006/flags/Lenovo-Platform-Settings-V1.2-KBL-revC.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-revF.xml
http://www.spec.org/cpu2006/flags/Lenovo-Platform-Settings-V1.2-KBL-revC.xml

For questions about this result, please contact the tester.
For other inquiries, please contact webmaster@spec.org.

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