SPEC® CFP2006 Result
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Lenovo Global Technology

$SPECfp^{®}2006 =$ 95.1

$SPECfp\_base2006 =$ 93.7

Lenovo ThinkServer TS150
(3.00 GHz, Intel Xeon E3-1220 v6)

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

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

Benchmark	Result
410.bwaves	159
416.gamess	48.7 / 46.4
433.milc	98.2
434.zeusmp	209
435.gromacs	61.3
436.cactusADM	382
437.leslie3d	117
444.namd	34.3 / 33.7
447.dealII	71.8
450.soplex	51.3
453.povray	72.9 / 64.9
454.calculix	72.9 / 72.8
459.GemsFDTD	90.4 / 89.1
465.tonto	65.8 / 62.3
470.lbm	213
481.wrf	130
482.sphinx3	88.3

SPECfp_base2006 = 93.7

SPECfp2006 = 95.1

Hardware

CPU Name: Intel Xeon E3-1220 v6
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

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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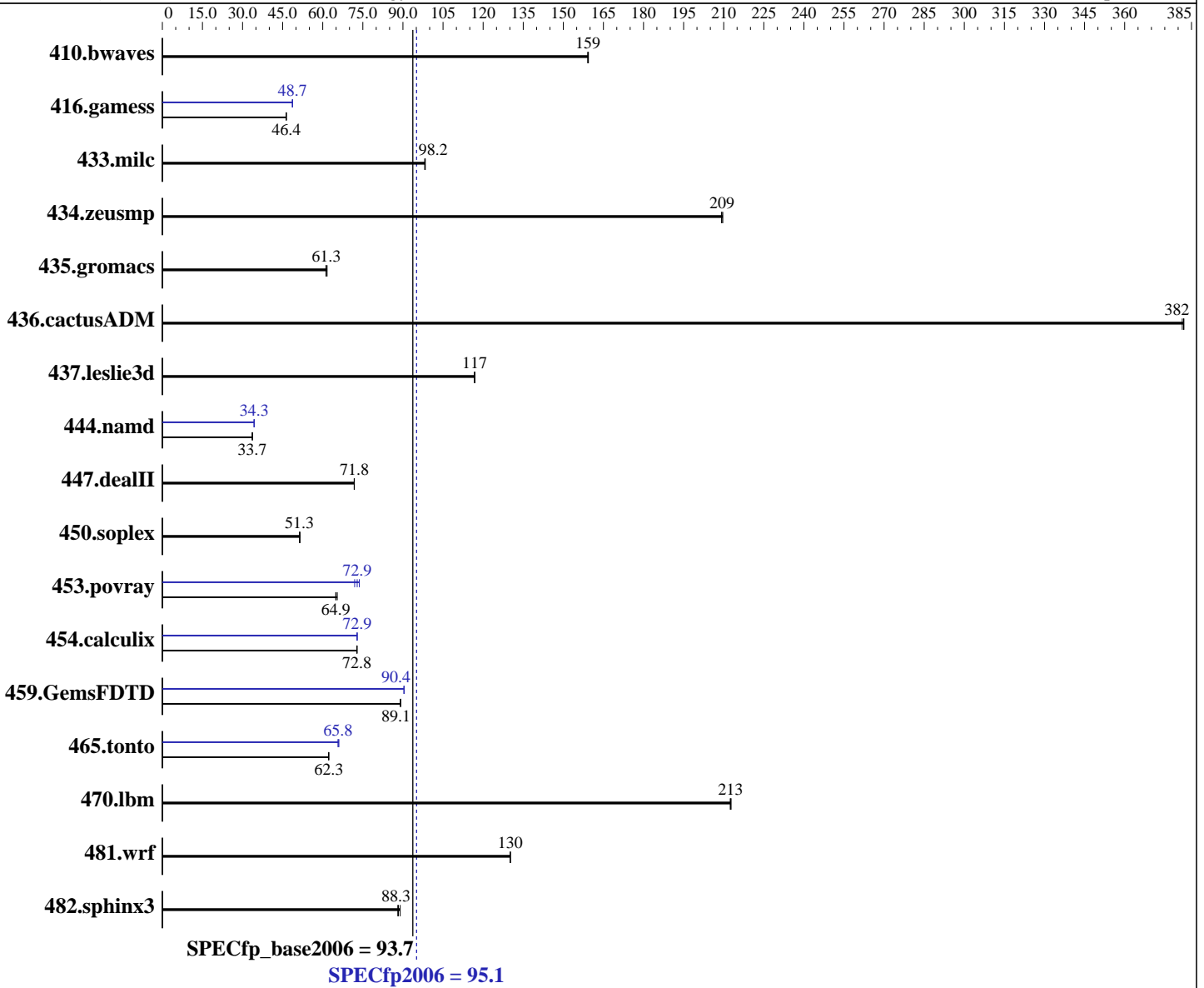|	
CPU2006 license: 9017	**Test date:** Aug-2017
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L3 Cache:	8 MB I+D on chip per chip	System State:	Run level 3 (multi-user)
Other Cache:	None	Base Pointers:	64-bit
Memory:	64 GB (4 x 16 GB 2Rx8 PC4-2400T-U)	Peak Pointers:	32/64-bit
Disk Subsystem:	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	**85.3**	**159**	85.4	159	85.3	159	**85.3**	**159**	85.4	159	85.3	159
416.gamess	422	46.4	**422**	**46.4**	423	46.3	402	48.7	**402**	**48.7**	403	48.6
433.milc	93.5	98.2	93.3	98.4	**93.5**	**98.2**	93.5	98.2	93.3	98.4	**93.5**	**98.2**
434.zeusmp	43.4	210	**43.5**	**209**	43.5	209	43.4	210	**43.5**	**209**	43.5	209
435.gromacs	116	61.6	**116**	**61.3**	117	61.2	116	61.6	**116**	**61.3**	117	61.2
436.cactusADM	31.3	382	**31.3**	**382**	31.3	382	31.3	382	**31.3**	**382**	31.3	382
437.leslie3d	80.4	117	**80.4**	**117**	80.6	117	80.4	117	**80.4**	**117**	80.6	117
444.namd	238	33.7	**238**	**33.7**	239	33.6	233	34.4	**234**	**34.3**	234	34.3
447.dealII	159	71.7	**159**	**71.8**	159	71.8	159	71.7	**159**	**71.8**	159	71.8
450.soplex	163	51.3	162	51.5	**163**	**51.3**	163	51.3	162	51.5	**163**	**51.3**
453.povray	**82.0**	**64.9**	81.3	65.4	82.0	64.9	72.2	73.7	**73.0**	**72.9**	74.0	71.9
454.calculix	**113**	**72.8**	113	72.8	113	72.8	113	72.9	113	72.8	**113**	**72.9**
459.GemsFDTD	119	89.1	**119**	**89.1**	119	89.1	117	90.4	**117**	**90.4**	117	90.4
465.tonto	**158**	**62.3**	158	62.3	158	62.2	150	65.8	149	66.0	**150**	**65.8**
470.lbm	64.6	213	**64.6**	**213**	64.7	212	64.6	213	**64.6**	**213**	64.7	212
481.wrf	85.8	130	85.8	130	**85.8**	**130**	85.8	130	85.8	130	**85.8**	**130**
482.sphinx3	219	89.0	**221**	**88.3**	221	88.1	219	89.0	**221**	**88.3**	221	88.1

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:
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 Thu Aug 10 21:01:38 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
```

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Platform Notes (Continued)

```
From /proc/cpuinfo
   model name : Intel(R) Xeon(R) CPU E3-1220 v6 @ 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:       65910788 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 Aug 10 14:04

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:
   4x Micron 16ATF2G64AZ-2G3B1 16 GB 2 rank 2400 MHz

(End of data from sysinfo program)
```

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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"
LD_LIBRARY_PATH = "$LD_LIBRARY_PATH:/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
  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 -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:

     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`

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Peak Optimization Flags (Continued)

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

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

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