SPEC® CFP2006 Result

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Lenovo Global Technology

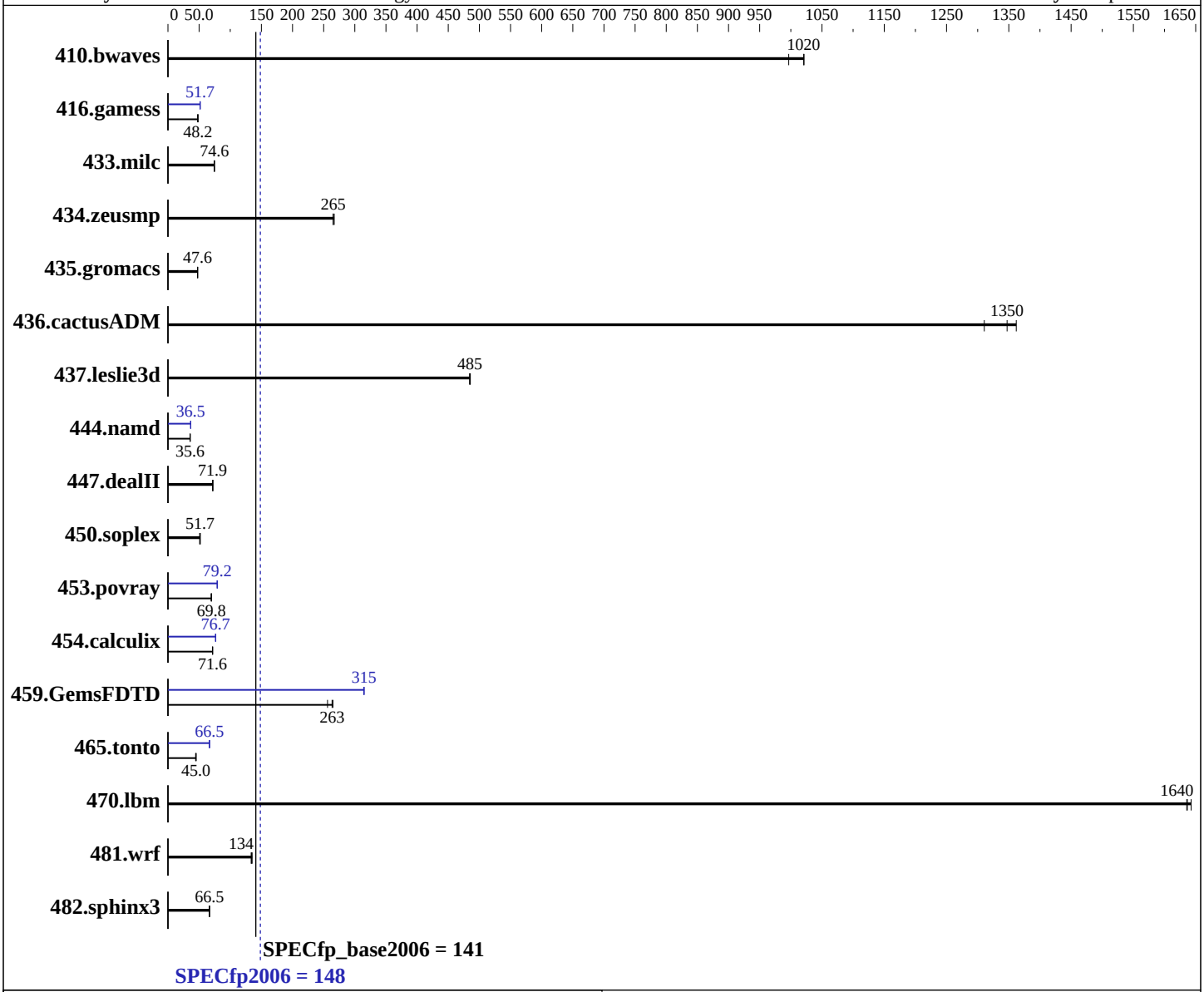
ThinkSystem SR650
(2.10 GHz, Intel Xeon Platinum 8160T)

SPECfp®2006 = 148

SPECfp_base2006 = 141

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

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



Hardware

CPU Name:	Intel Xeon Platinum 8160T
CPU Characteristics:	Intel Turbo Boost Technology up to 3.70 GHz
CPU MHz:	2100
FPU:	Integrated
CPU(s) enabled:	48 cores, 2 chips, 24 cores/chip
CPU(s) orderable:	1,2 chips
Primary Cache:	32 KB I + 32 KB D on chip per core
Secondary Cache:	1 MB I+D on chip per core

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Software

Operating System:	SUSE Linux Enterprise Server 12 SP2 (x86_64) Kernel 4.4.21-69-default
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:	btrfs
System State:	Run level 3 (multi-user)

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L3 Cache: 33 MB I+D on chip per chip
Other Cache: None
Memory: 384 GB (24 x 16 GB 2Rx8 PC4-2666V-R)
Disk Subsystem: 1 x 800 GB SAS SSD
Other Hardware: None

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	13.6	997	**13.3**	**1020**	13.3	1020	13.6	997	**13.3**	**1020**	13.3	1020
416.gamess	**406**	**48.2**	406	48.3	412	47.5	379	51.7	**379**	**51.7**	379	51.7
433.milc	**123**	**74.6**	123	74.7	124	74.2	**123**	**74.6**	123	74.7	124	74.2
434.zeusmp	34.3	265	34.1	267	**34.3**	**265**	34.3	265	34.1	267	**34.3**	**265**
435.gromacs	150	47.5	**150**	**47.6**	149	47.8	150	47.5	**150**	**47.6**	149	47.8
436.cactusADM	**8.87**	**1350**	9.12	1310	8.77	1360	**8.87**	**1350**	9.12	1310	8.77	1360
437.leslie3d	19.4	485	**19.4**	**485**	19.4	484	19.4	485	**19.4**	**485**	19.4	484
444.namd	**225**	**35.6**	225	35.6	225	35.6	**220**	**36.5**	220	36.5	220	36.5
447.dealII	**159**	**71.9**	159	71.8	158	72.2	**159**	**71.9**	159	71.8	158	72.2
450.soplex	161	51.7	**161**	**51.7**	164	50.9	161	51.7	**161**	**51.7**	164	50.9
453.povray	**76.2**	**69.8**	76.8	69.3	76.1	69.9	67.2	79.2	67.4	78.9	**67.2**	**79.2**
454.calculix	115	71.8	115	71.6	**115**	**71.6**	107	76.8	**108**	**76.7**	108	76.2
459.GemsFDTD	**40.3**	**263**	41.4	256	40.1	265	**33.7**	**315**	33.8	314	33.7	315
465.tonto	217	45.3	222	44.4	**219**	**45.0**	147	66.9	**148**	**66.5**	148	66.5
470.lbm	8.36	1640	**8.40**	**1640**	8.40	1640	8.36	1640	**8.40**	**1640**	8.40	1640
481.wrf	**83.3**	**134**	82.6	135	83.6	134	**83.3**	**134**	82.6	135	83.6	134
482.sphinx3	293	66.4	**293**	**66.5**	291	66.9	293	66.4	**293**	**66.5**	291	66.9

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:
Operating Mode set to Maximum Performance
Hyper-Threading set to Disabled
LLC dead line alloc set to Disable
 Sysinfo program /home/cpu2006-1.2-ic17.0u3/config/sysinfo.rev6993
 Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
 running on Cyborg-SPECcpu2006-SUSE12SP2 Mon Jul 17 15:06:57 2017

 This section contains SUT (System Under Test) info as seen by
 some common utilities.  To remove or add to this section, see:
```

Continued on next page

Platform Notes (Continued)

```
      http://www.spec.org/cpu2006/Docs/config.html#sysinfo

    From /proc/cpuinfo
       model name : Intel(R) Xeon(R) Platinum 8160T CPU @ 2.10GHz
          2 "physical id"s (chips)
          48 "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 : 24
          siblings  : 24
          physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26
          27 28 29
          physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26
          27 28 29
       cache size : 33792 KB

    From /proc/meminfo
       MemTotal:       395892648 kB
       HugePages_Total:       0
       Hugepagesize:       2048 kB

    From /etc/*release* /etc/*version*
       SuSE-release:
          SUSE Linux Enterprise Server 12 (x86_64)
          VERSION = 12
          PATCHLEVEL = 2
          # This file is deprecated and will be removed in a future service pack or
          release.
          # Please check /etc/os-release for details about this release.
       os-release:
          NAME="SLES"
          VERSION="12-SP2"
          VERSION_ID="12.2"
          PRETTY_NAME="SUSE Linux Enterprise Server 12 SP2"
          ID="sles"
          ANSI_COLOR="0;32"
          CPE_NAME="cpe:/o:suse:sles:12:sp2"

    uname -a:
       Linux Cyborg-SPECcpu2006-SUSE12SP2 4.4.21-69-default #1 SMP Tue Oct 25
       10:58:20 UTC 2016 (9464f67) x86_64 x86_64 x86_64 GNU/Linux

    run-level 3 Jul 17 15:06

    SPEC is set to: /home/cpu2006-1.2-ic17.0u3
       Filesystem     Type   Size  Used Avail Use% Mounted on
       /dev/sdb2      btrfs  744G   30G  711G   4% /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
```

Continued on next page

Platform Notes (Continued)

```
     determined", but the intent may not be met, as there are frequent changes to
     hardware, firmware, and the "DMTF SMBIOS" standard.

    BIOS Lenovo -[IVE109Q-1.00]- 06/28/2017
    Memory:
     24x Samsung M393A2K43BB1-CTD 16 GB 2 rank 2666 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,0,3"
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 = "48"

 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

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Base Portability Flags (Continued)

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

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

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

Continued on next page

Peak Optimization Flags (Continued)

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-Flags-V1.2-SKL-C.20171004.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-Flags-V1.2-SKL-C.20171004.xml`

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