SPEC® CFP2006 Result

Lenovo Global Technology

$SPECfp^{®}\_rate2006 = \quad 3150$

ThinkSystem SN850
(2.00 GHz, Intel Xeon Platinum 8164)

$SPECfp\_rate\_base2006 = \quad 3060$

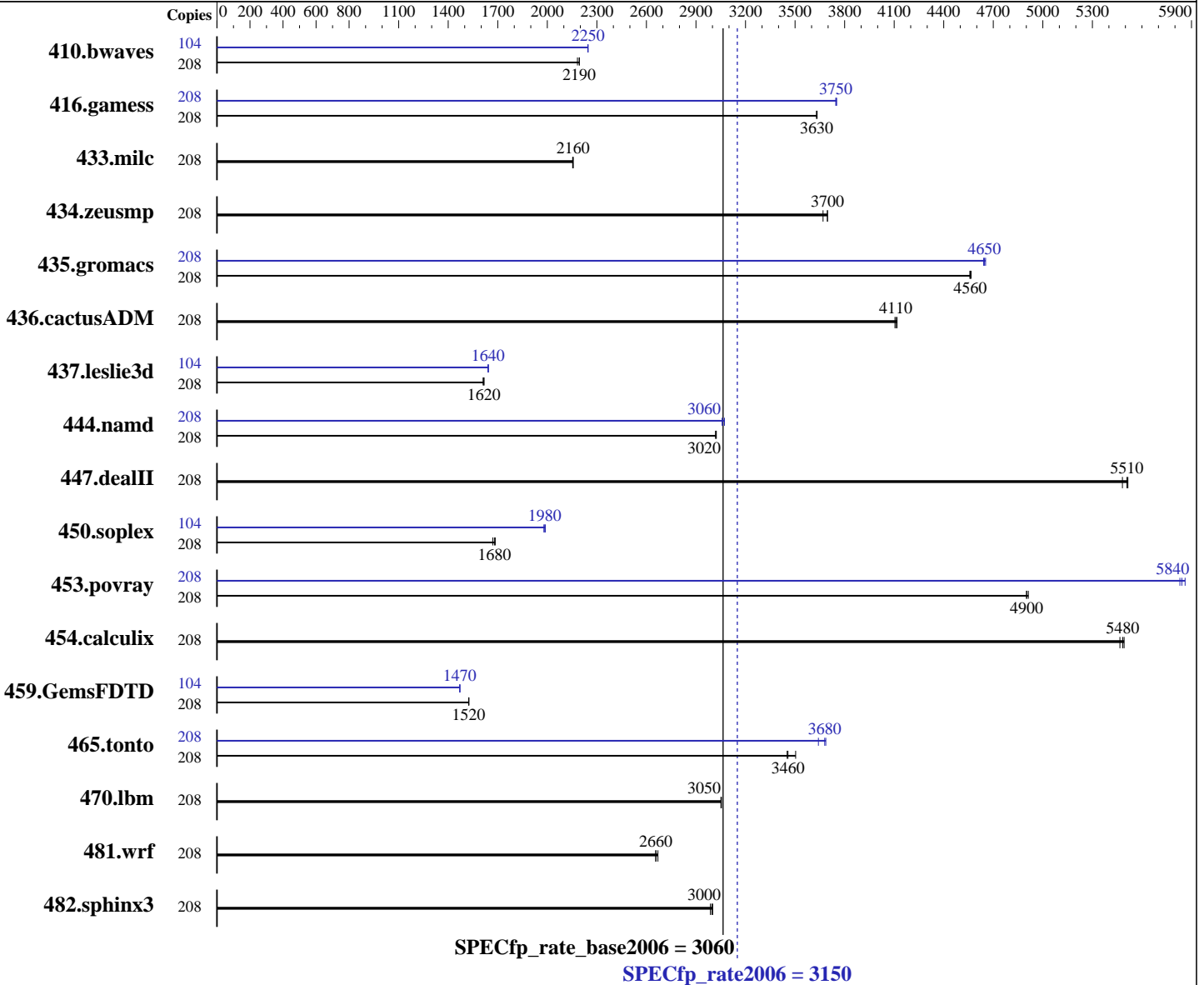|	
CPU2006 license: 9017	**Test date:** Aug-2017
Test sponsor: Lenovo Global Technology	**Hardware Availability:** Aug-2017
Tested by: Lenovo Global Technology	**Software Availability:** Nov-2016

Graph data (Copies and result values):

- **410.bwaves** — 104: 2250; 208: 2190
- **416.gamess** — 208: 3750; 208: 3630
- **433.milc** — 208: 2160
- **434.zeusmp** — 208: 3700
- **435.gromacs** — 208: 4650; 208: 4560
- **436.cactusADM** — 208: 4110
- **437.leslie3d** — 104: 1640; 208: 1620
- **444.namd** — 208: 3060; 208: 3020
- **447.dealII** — 208: 5510
- **450.soplex** — 104: 1980; 208: 1680
- **453.povray** — 208: 5840; 208: 4900
- **454.calculix** — 208: 5480
- **459.GemsFDTD** — 104: 1470; 208: 1520
- **465.tonto** — 208: 3680; 208: 3460
- **470.lbm** — 208: 3050
- **481.wrf** — 208: 2660
- **482.sphinx3** — 208: 3000

SPECfp_rate_base2006 = 3060

SPECfp_rate2006 = 3150

Hardware

CPU Name:	Intel Xeon Platinum 8164
CPU Characteristics:	Intel Turbo Boost Technology up to 3.70 GHz
CPU MHz:	2000
FPU:	Integrated
CPU(s) enabled:	104 cores, 4 chips, 26 cores/chip, 2 threads/core
CPU(s) orderable:	2,4 chips
Primary Cache:	32 KB I + 32 KB D on chip per core
Secondary Cache:	1 MB I+D on chip per core

Continued on next page

Software

Operating System:	SUSE Linux Enterprise Server 12 SP2 (x86_64) Kernel 4.4.21-69-default
Compiler:	C/C++: Version 17.0.0.098 of Intel C/C++ Compiler for Linux; Fortran: Version 17.0.0.098 of Intel Fortran Compiler for Linux
Auto Parallel:	No
File System:	tmpfs
System State:	Run level 3 (multi-user)

Continued on next page

SPEC CFP2006 Result
Copyright 2006-2017 Standard Performance Evaluation Corporation

Lenovo Global Technology

ThinkSystem SN850
(2.00 GHz, Intel Xeon Platinum 8164)

$SPECfp\_rate2006 = 3150$

$SPECfp\_rate\_base2006 = 3060$

CPU2006 license: 9017	**Test date:** Aug-2017
Test sponsor: Lenovo Global Technology	**Hardware Availability:** Aug-2017
Tested by: Lenovo Global Technology	**Software Availability:** Nov-2016

L3 Cache:	35.75 MB I+D on chip per chip	Base Pointers:	32/64-bit
Other Cache:	None	Peak Pointers:	32/64-bit
Memory:	1536 GB (48 x 32 GB 2Rx4 PC4-2666V-R)	Other Software:	None
Disk Subsystem:	1 x 960 GB SATA SSD		
Other Hardware:	None		

Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	208	**1289**	**2190**	1288	2190	1295	2180	104	629	2250	629	2250	**629**	**2250**
416.gamess	208	**1122**	**3630**	1122	3630	1121	3630	208	**1087**	**3750**	1087	3750	1085	3750
433.milc	208	885	2160	**886**	**2160**	887	2150	208	885	2160	**886**	**2160**	887	2150
434.zeusmp	208	**512**	**3700**	512	3700	516	3670	208	**512**	**3700**	512	3700	516	3670
435.gromacs	208	326	4560	**326**	**4560**	325	4570	208	320	4640	**320**	**4650**	319	4650
436.cactusADM	208	606	4100	**605**	**4110**	604	4120	208	606	4100	**605**	**4110**	604	4120
437.leslie3d	208	1209	1620	1214	1610	**1210**	**1620**	104	595	1640	596	1640	**595**	**1640**
444.namd	208	**552**	**3020**	552	3020	553	3020	208	545	3060	**545**	**3060**	543	3070
447.dealII	208	431	5520	434	5480	**432**	**5510**	208	431	5520	434	5480	**432**	**5510**
450.soplex	208	1039	1670	**1033**	**1680**	1030	1680	104	438	1980	436	1990	**437**	**1980**
453.povray	208	225	4910	**226**	**4900**	226	4900	208	189	5860	**189**	**5840**	190	5830
454.calculix	208	**313**	**5480**	312	5490	314	5470	208	**313**	**5480**	312	5490	314	5470
459.GemsFDTD	208	1446	1530	1448	1520	**1448**	**1520**	104	750	1470	751	1470	**750**	**1470**
465.tonto	208	**592**	**3460**	593	3450	584	3500	208	555	3690	562	3640	**556**	**3680**
470.lbm	208	937	3050	**936**	**3050**	936	3050	208	937	3050	**936**	**3050**	936	3050
481.wrf	208	875	2660	**874**	**2660**	870	2670	208	875	2660	**874**	**2660**	870	2670
482.sphinx3	208	1357	2990	1351	3000	**1353**	**3000**	208	1357	2990	1351	3000	**1353**	**3000**

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Submit Notes

    The numactl mechanism was used to bind copies to processors. The config file option 'submit'
    was used to generate numactl commands to bind each copy to a specific processor.
    For details, please see the config file.

Operating System Notes

    Stack size set to unlimited using "ulimit -s unlimited"
    Tmpfs filesystem can be set with:
     mount -t tmpfs -o size=800g tmpfs /home

SPEC CFP2006 Result
Copyright 2006-2017 Standard Performance Evaluation Corporation

Lenovo Global Technology

$SPECfp_rate2006 = $ 3150

ThinkSystem SN850
(2.00 GHz, Intel Xeon Platinum 8164)

$SPECfp_rate_base2006 = $ 3060

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

Test date: Aug-2017
Hardware Availability: Aug-2017
Software Availability: Nov-2016

Platform Notes

```
    BIOS configuration:
     Choose Operating Mode set to Maximum Performance
     Adjacent Cache Prefetch set to Disable
     DCU Streamer Prefetcher set to Disable
     SNC set to Enable
     Stale Atos set to Disable
     LLC dead line alloc set to Disable
    Sysinfo program /home/cpu2006-1.2-ic17.0/config/sysinfo.rev6993
    Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
    running on SN850-01 Wed Aug  2 18:50:01 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) Platinum 8164 CPU @ 2.00GHz
          4 "physical id"s (chips)
          208 "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 : 26
          siblings  : 52
          physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25
          26 27 28 29
          physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25
          26 27 28 29
          physical 2: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25
          26 27 28 29
          physical 3: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25
          26 27 28 29
       cache size : 36608 KB

    From /proc/meminfo
       MemTotal:       1584965048 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"
```

Lenovo Global Technology

ThinkSystem SN850
(2.00 GHz, Intel Xeon Platinum 8164)

$SPECfp_rate2006 = $ 3150

$SPECfp_rate_base2006 = $ 3060

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

Test date: Aug-2017
Hardware Availability: Aug-2017
Software Availability: Nov-2016

Platform Notes (Continued)

```
        ID="sles"
        ANSI_COLOR="0;32"
        CPE_NAME="cpe:/o:suse:sles:12:sp2"

  uname -a:
     Linux SN850-01 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 Aug 2 18:46

  SPEC is set to: /home/cpu2006-1.2-ic17.0
     Filesystem      Type    Size   Used Avail Use% Mounted on
     tmpfs          tmpfs   800G   4.5G  796G   1% /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 -[IVE109A-1.00]- 04/27/2017
   Memory:
   48x Samsung M393A4K40BB2-CTD 32 GB 2 rank 2666 MHz

  (End of data from sysinfo program)
```

General Notes

```
Environment variables set by runspec before the start of the run:
LD_LIBRARY_PATH = "/home/cpu2006-1.2-ic17.0/libs/32:/home/cpu2006-1.2-ic17.0/libs/64:/home/cpu2006-1.2-ic17.0/sh10.2"

 Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM
 memory using Redhat Enterprise Linux 7.2
 Transparent Huge Pages enabled by default
 Filesystem page cache cleared with:
 echo 1>        /proc/sys/vm/drop_caches
 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
```

Lenovo Global Technology

ThinkSystem SN850
(2.00 GHz, Intel Xeon Platinum 8164)

$SPECfp\_rate2006 = \quad 3150$

$SPECfp\_rate\_base2006 = \quad 3060$

CPU2006 license: 9017

Test sponsor: Lenovo Global Technology

Tested by: Lenovo Global Technology

Test date: Aug-2017

Hardware Availability: Aug-2017

Software Availability: Nov-2016

Base Compiler Invocation (Continued)

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
```

Base Optimization Flags

C benchmarks:
```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -auto-p32
-qopt-mem-layout-trans=3
```

C++ benchmarks:
```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -auto-p32
-qopt-mem-layout-trans=3
```

Fortran benchmarks:
```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
```

Benchmarks using both Fortran and C:
```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -auto-p32
-qopt-mem-layout-trans=3
```

Peak Compiler Invocation

C benchmarks:
```
icc -m64
```

SPEC CFP2006 Result
Copyright 2006-2017 Standard Performance Evaluation Corporation

Lenovo Global Technology

ThinkSystem SN850
(2.00 GHz, Intel Xeon Platinum 8164)

SPECfp_rate2006 =   3150

SPECfp_rate_base2006 = 3060

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

Test date: Aug-2017
Hardware Availability: Aug-2017
Software Availability: Nov-2016

Peak Compiler Invocation (Continued)

C++ benchmarks (except as noted below):
        icpc -m64

    450.soplex: `icpc -m32 -L/opt/intel/compilers_and_libraries_2017/linux/lib/ia32`

Fortran benchmarks:
        ifort -m64

Benchmarks using both Fortran and C:
        icc -m64 ifort -m64

Peak 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: -D_FILE_OFFSET_BITS=64
        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

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
                -qopt-mem-layout-trans=3

Lenovo Global Technology

ThinkSystem SN850
(2.00 GHz, Intel Xeon Platinum 8164)

SPECfp_rate2006 =   3150

SPECfp_rate_base2006 = 3060

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

Test date: Aug-2017
Hardware Availability: Aug-2017
Software Availability: Nov-2016

Peak Optimization Flags (Continued)

```
        447.dealII: basepeak = yes

        450.soplex: -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) -qopt-malloc-options=3
                    -qopt-mem-layout-trans=3

        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 -qopt-mem-layout-trans=3
```

Fortran benchmarks:

```
        410.bwaves: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch

        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: Same as 410.bwaves

      459.GemsFDTD: Same as 410.bwaves

         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) -unroll4 -auto -inline-calloc
                    -qopt-malloc-options=3
```

Benchmarks using both Fortran and C:

```
       435.gromacs: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
                    -par-num-threads=1(pass 1) -qopt-prefetch -auto-ilp32
                    -qopt-mem-layout-trans=3

      436.cactusADM: basepeak = yes

       454.calculix: basepeak = yes

           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.html
http://www.spec.org/cpu2006/flags/Lenovo-Platform-Flags-V1.2-SKL-C.html

SPEC CFP2006 Result
Copyright 2006-2017 Standard Performance Evaluation Corporation

Lenovo Global Technology

ThinkSystem SN850
(2.00 GHz, Intel Xeon Platinum 8164)

$SPECfp\_rate2006 = \quad 3150$

$SPECfp\_rate\_base2006 = \quad 3060$

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

Test date: Aug-2017
Hardware Availability: Aug-2017
Software Availability: Nov-2016

You can also download the XML flags sources by saving the following links:

http://www.spec.org/cpu2006/flags/Intel-ic17.0-official-linux64.xml
http://www.spec.org/cpu2006/flags/Lenovo-Platform-Flags-V1.2-SKL-C.xml

SPEC and SPECfp are registered trademarks of the Standard Performance
Evaluation Corporation. All other brand and product names appearing in
this result are trademarks or registered trademarks of their respective
holders.

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

Tested with SPEC CPU2006 v1.2.
Report generated on Wed Sep 20 11:07:38 2017 by SPEC CPU2006 PS/PDF formatter v6932.
Originally published on 19 September 2017.