SPEC® CFP2006 Result
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Lenovo Global Technology

ThinkSystem SR850
(2.40 GHz, Intel Xeon Gold 5115)

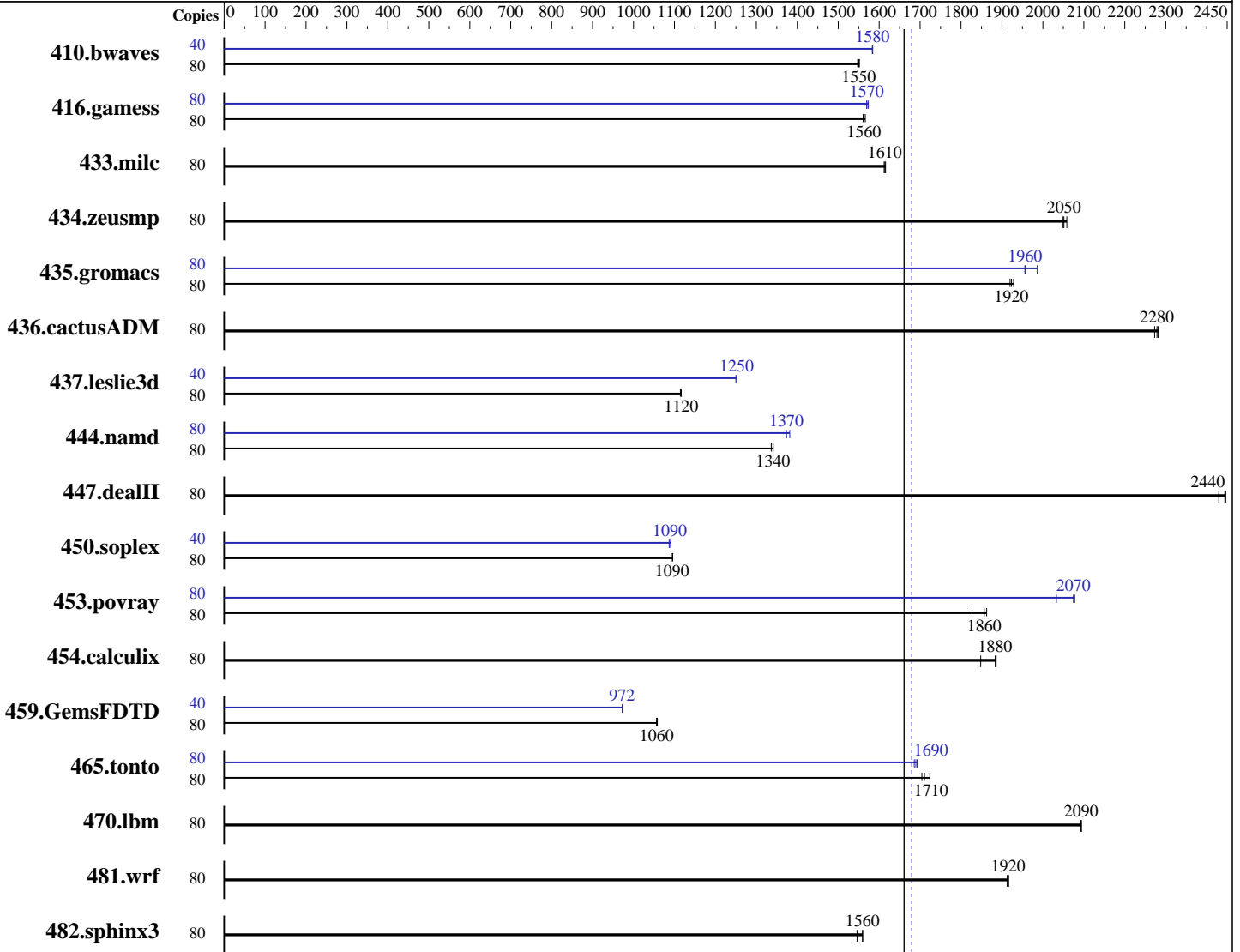$SPECfp^®\_rate2006 =$ 1680

$SPECfp\_rate\_base2006 =$ 1660

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

Copies

410.bwaves 40 1580
410.bwaves 80 1550
416.gamess 80 1570
416.gamess 80 1560
433.milc 80 1610
434.zeusmp 80 2050
435.gromacs 80 1960
435.gromacs 80 1920
436.cactusADM 80 2280
437.leslie3d 40 1250
437.leslie3d 80 1120
444.namd 80 1370
444.namd 80 1340
447.dealII 80 2440
450.soplex 40 1090
450.soplex 80 1090
453.povray 80 2070
453.povray 80 1860
454.calculix 80 1880
459.GemsFDTD 40 972
459.GemsFDTD 80 1060
465.tonto 80 1690
465.tonto 80 1710
470.lbm 80 2090
481.wrf 80 1920
482.sphinx3 80 1560

SPECfp_rate_base2006 = 1660

SPECfp_rate2006 = 1680

Hardware

CPU Name:	Intel Xeon Gold 5115
CPU Characteristics:	Intel Turbo Boost Technology up to 3.20 GHz
CPU MHz:	2400
FPU:	Integrated
CPU(s) enabled:	40 cores, 4 chips, 10 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 17.0.3.191 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
System State:	Run level 3 (multi-user)

Continued on next page

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L3 Cache:	13.75 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, running at 2400)	Other Software:	None
Disk Subsystem:	1 x 800 GB SAS 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	80	701	1550	703	1550	**701**	**1550**	40	343	1580	343	1580	**343**	**1580**
416.gamess	80	**1002**	**1560**	1004	1560	1000	1570	80	**998**	**1570**	998	1570	995	1570
433.milc	80	**455**	**1610**	456	1610	455	1620	80	**455**	**1610**	456	1610	455	1620
434.zeusmp	80	**355**	**2050**	354	2060	355	2050	80	**355**	**2050**	354	2060	355	2050
435.gromacs	80	296	1930	298	1920	**297**	**1920**	80	292	1960	**292**	**1960**	288	1990
436.cactusADM	80	**420**	**2280**	419	2280	421	2270	80	**420**	**2280**	419	2280	421	2270
437.leslie3d	80	674	1120	675	1110	**674**	**1120**	40	301	1250	**300**	**1250**	300	1250
444.namd	80	**479**	**1340**	480	1340	478	1340	80	467	1370	464	1380	**467**	**1370**
447.dealII	80	**374**	**2440**	377	2430	374	2450	80	**374**	**2440**	377	2430	374	2450
450.soplex	80	609	1100	**609**	**1090**	611	1090	40	307	1090	**306**	**1090**	306	1090
453.povray	80	**229**	**1860**	233	1830	228	1860	80	209	2030	205	2080	**205**	**2070**
454.calculix	80	**350**	**1880**	357	1850	350	1890	80	**350**	**1880**	357	1850	350	1890
459.GemsFDTD	80	802	1060	**803**	**1060**	803	1060	40	436	973	**436**	**972**	436	972
465.tonto	80	462	1700	457	1720	**460**	**1710**	80	467	1690	**466**	**1690**	465	1690
470.lbm	80	525	2090	525	2090	**525**	**2090**	80	525	2090	525	2090	**525**	**2090**
481.wrf	80	**466**	**1920**	467	1910	466	1920	80	**466**	**1920**	467	1910	466	1920
482.sphinx3	80	1000	1560	**1000**	**1560**	1009	1550	80	1000	1560	**1000**	**1560**	1009	1550

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"

Platform Notes

   BIOS Configuration:
    Choose Operating Mode set to Maximum Performance
    Execute Disable Bit set to Disable

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Platform Notes (Continued)

```
DCU Streamer Prefetcher set to Disable
Intel Virtualization Technology set to Disable
Stale AtoS set to Enable
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 Electron-node-02 Tue Dec 19 21:34:58 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) Gold 5115 CPU @ 2.40GHz
      4 "physical id"s (chips)
      80 "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 : 10
      siblings  : 20
      physical 0: cores 0 1 2 3 4 8 9 10 11 12
      physical 1: cores 0 1 2 3 4 8 9 10 11 12
      physical 2: cores 0 1 2 3 4 8 9 10 11 12
      physical 3: cores 0 1 2 3 4 8 9 10 11 12
   cache size : 14080 KB

From /proc/meminfo
   MemTotal:      1584976124 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 Electron-node-02 4.4.21-69-default #1 SMP Tue Oct 25 10:58:20 UTC 2016
   (9464f67) x86_64 x86_64 x86_64 GNU/Linux
```

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Platform Notes (Continued)

```
 run-level 3 Dec 19 10:44

 SPEC is set to: /home/cpu2006-1.2-ic17.0u3
    Filesystem      Type  Size  Used Avail Use% Mounted on
    /dev/sda4       xfs   688G  143G  546G  21% /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 -[TEE115E-1.01]- 08/11/2017
   Memory:
    48x Samsung M393A4K40BB2-CTD 32 GB 2 rank 2666 MHz, configured at 2400 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-ic17.0u3/lib/ia32:/home/cpu2006-1.2-ic17.0u3/lib/intel64:/home/cpu2006-1.2-ic17.0u3/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:
 shell invocation of 'sync; echo 3 > /proc/sys/vm/drop_caches' prior to run
 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

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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-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch -auto-p32
    -qopt-mem-layout-trans=3
```

C++ benchmarks:
```
    -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch -auto-p32
    -qopt-mem-layout-trans=3
```

Fortran benchmarks:
```
    -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
```

Benchmarks using both Fortran and C:
```
    -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch -auto-p32
    -qopt-mem-layout-trans=3
```

Peak Compiler Invocation

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

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

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

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Peak Compiler Invocation (Continued)

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-AVX512(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

      447.dealII: basepeak = yes
```

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Peak Optimization Flags (Continued)

  450.soplex: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512(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-AVX512(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-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch

  416.gamess: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512(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-AVX512(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-AVX512(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-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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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 Jan 10 12:32:41 2018 by SPEC CPU2006 PS/PDF formatter v6932.
Originally published on 10 January 2018.