SPEC® CFP2006 Result
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Lenovo Global Technology

ThinkSystem SN550
(3.20 GHz, Intel Xeon Gold 6134)

$SPECfp®\_rate2006 = 965$

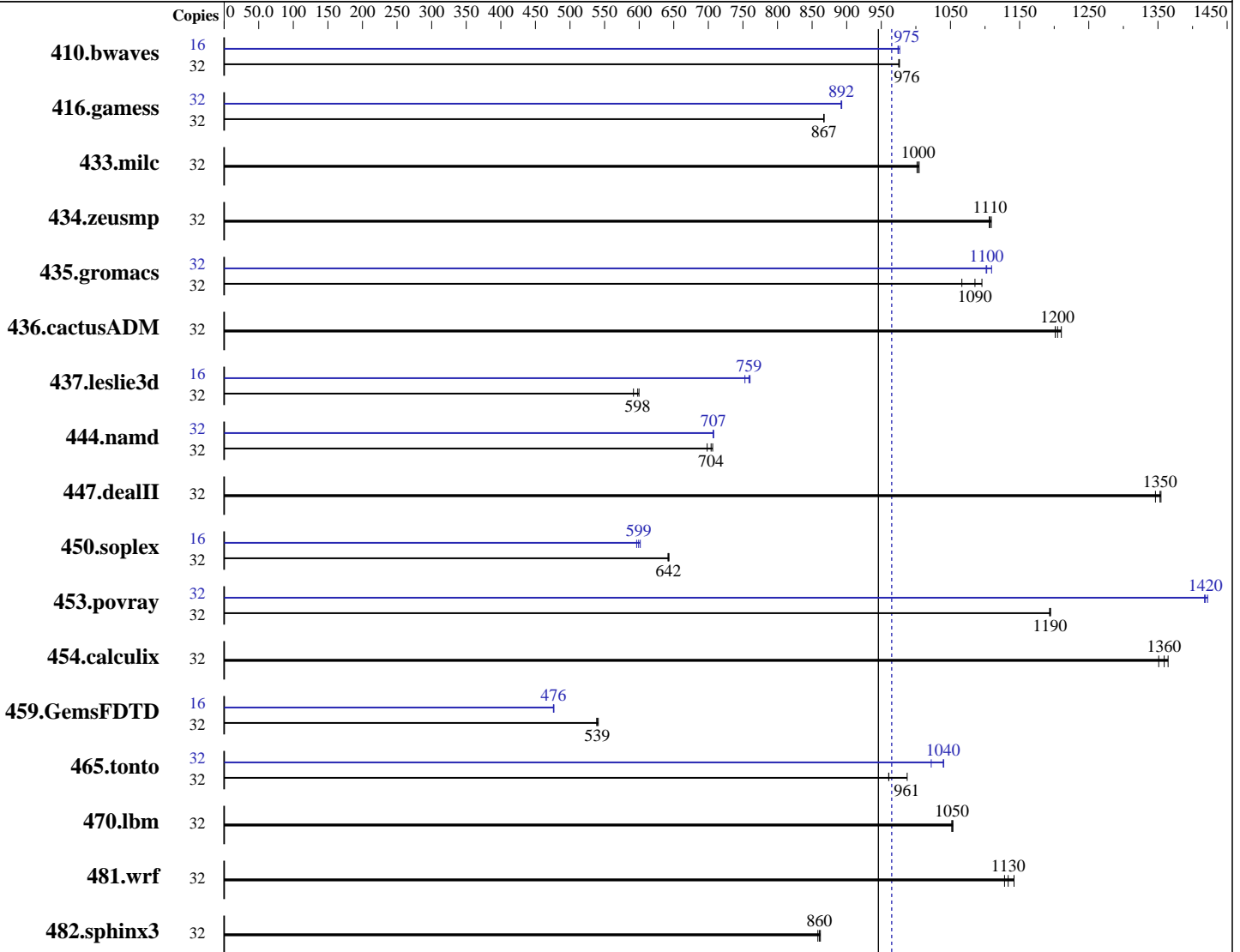$SPECfp\_rate\_base2006 = 946$

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

SPECfp_rate_base2006 = 946

SPECfp_rate2006 = 965

Benchmark	Copies	Result
410.bwaves	16	975
	32	976
416.gamess	32	892
	32	867
433.milc	32	1000
434.zeusmp	32	1110
435.gromacs	32	1100
	32	1090
436.cactusADM	32	1200
437.leslie3d	16	759
	32	598
444.namd	32	707
	32	704
447.dealII	32	1350
450.soplex	16	599
	32	642
453.povray	32	1420
	32	1190
454.calculix	32	1360
459.GemsFDTD	16	476
	32	539
465.tonto	32	1040
	32	961
470.lbm	32	1050
481.wrf	32	1130
482.sphinx3	32	860

Hardware

CPU Name: Intel Xeon Gold 6134
CPU Characteristics: Intel Turbo Boost Technology up to 3.70 GHz
CPU MHz: 3200
FPU: Integrated
CPU(s) enabled: 16 cores, 2 chips, 8 cores/chip, 2 threads/core
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

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: xfs
System State: Run level 3 (multi-user)

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L3 Cache:	24.75 MB I+D on chip per chip	Base Pointers:	32/64-bit
Other Cache:	None	Peak Pointers:	32/64-bit
Memory:	768 GB (24 x 32 GB 2Rx4 PC4-2666V-R)	Other Software:	None
Disk Subsystem:	1 x 800 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	32	445	976	**446**	**976**	446	975	16	223	977	**223**	**975**	223	974
416.gamess	32	723	867	**723**	**867**	723	867	32	702	893	**702**	**892**	702	892
433.milc	32	**293**	**1000**	293	1000	292	1000	32	**293**	**1000**	293	1000	292	1000
434.zeusmp	32	263	1110	263	1110	**263**	**1110**	32	263	1110	263	1110	**263**	**1110**
435.gromacs	32	214	1070	**210**	**1090**	209	1100	32	206	1110	**207**	**1100**	207	1100
436.cactusADM	32	**317**	**1200**	318	1200	316	1210	32	**317**	**1200**	318	1200	316	1210
437.leslie3d	32	**503**	**598**	502	600	508	592	16	**198**	**759**	198	760	200	753
444.namd	32	368	698	363	706	**365**	**704**	32	**363**	**707**	363	708	363	707
447.dealII	32	270	1350	**271**	**1350**	272	1350	32	270	1350	**271**	**1350**	272	1350
450.soplex	32	415	643	416	642	**416**	**642**	16	**223**	**599**	222	602	224	596
453.povray	32	142	1190	143	1190	**143**	**1190**	32	120	1420	**120**	**1420**	120	1420
454.calculix	32	193	1360	**194**	**1360**	195	1350	32	193	1360	**194**	**1360**	195	1350
459.GemsFDTD	32	630	539	**630**	**539**	628	541	16	356	477	357	476	**357**	**476**
465.tonto	32	319	987	**328**	**961**	328	961	32	308	1020	303	1040	**303**	**1040**
470.lbm	32	**418**	**1050**	417	1050	418	1050	32	**418**	**1050**	417	1050	418	1050
481.wrf	32	317	1130	313	1140	**315**	**1130**	32	317	1130	313	1140	**315**	**1130**
482.sphinx3	32	727	858	**725**	**860**	724	862	32	727	858	**725**	**860**	724	862

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
 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 SN550 Tue Aug 22 19:56:52 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 6134 CPU @ 3.20GHz
      2 "physical id"s (chips)
      32 "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 : 8
      siblings  : 16
      physical 0: cores 0 4 5 6 16 19 20 22
      physical 1: cores 0 2 3 9 16 19 26 27
   cache size : 25344 KB

From /proc/meminfo
   MemTotal:       792244240 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 SN550 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 22 19:54
```

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Platform Notes (Continued)

```
  SPEC is set to: /home/cpu2006-1.2-ic17.0
    Filesystem      Type  Size  Used Avail Use% Mounted on
    /dev/sda4       xfs   687G   26G  661G   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
    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:
  24x 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

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

Base Portability Flags

    410.bwaves: -DSPEC_CPU_LP64

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Base Portability Flags (Continued)

```
    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
```

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
```

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Peak Compiler Invocation (Continued)

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

       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
```

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Peak Optimization Flags (Continued)

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.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.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.

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