SPEC® CFP2006 Result
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Lenovo Global Technology

$SPECfp^{®}2006 = $ 144

ThinkSystem SR550
(2.10 GHz, Intel Xeon Gold 6130)

$SPECfp_base2006 = $ 137

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

410.bwaves — 1080
416.gamess — 53.0 / 49.3
433.milc — 77.2
434.zeusmp — 258
435.gromacs — 47.6
436.cactusADM — 1070
437.leslie3d — 438
444.namd — 36.5 / 35.6
447.dealII — 71.6
450.soplex — 50.8
453.povray — 80.0 / 70.6
454.calculix — 76.9 / 69.4
459.GemsFDTD — 317 / 268
465.tonto — 69.7 / 46.5
470.lbm — 1210
481.wrf — 129
482.sphinx3 — 69.4

SPECfp_base2006 = 137

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Hardware

CPU Name:	Intel Xeon Gold 6130
CPU Characteristics:	Intel Turbo Boost Technology up to 3.70 GHz
CPU MHz:	2100
FPU:	Integrated
CPU(s) enabled:	32 cores, 2 chips, 16 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

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:	Yes
File System:	btrfs
System State:	Run level 3 (multi-user)

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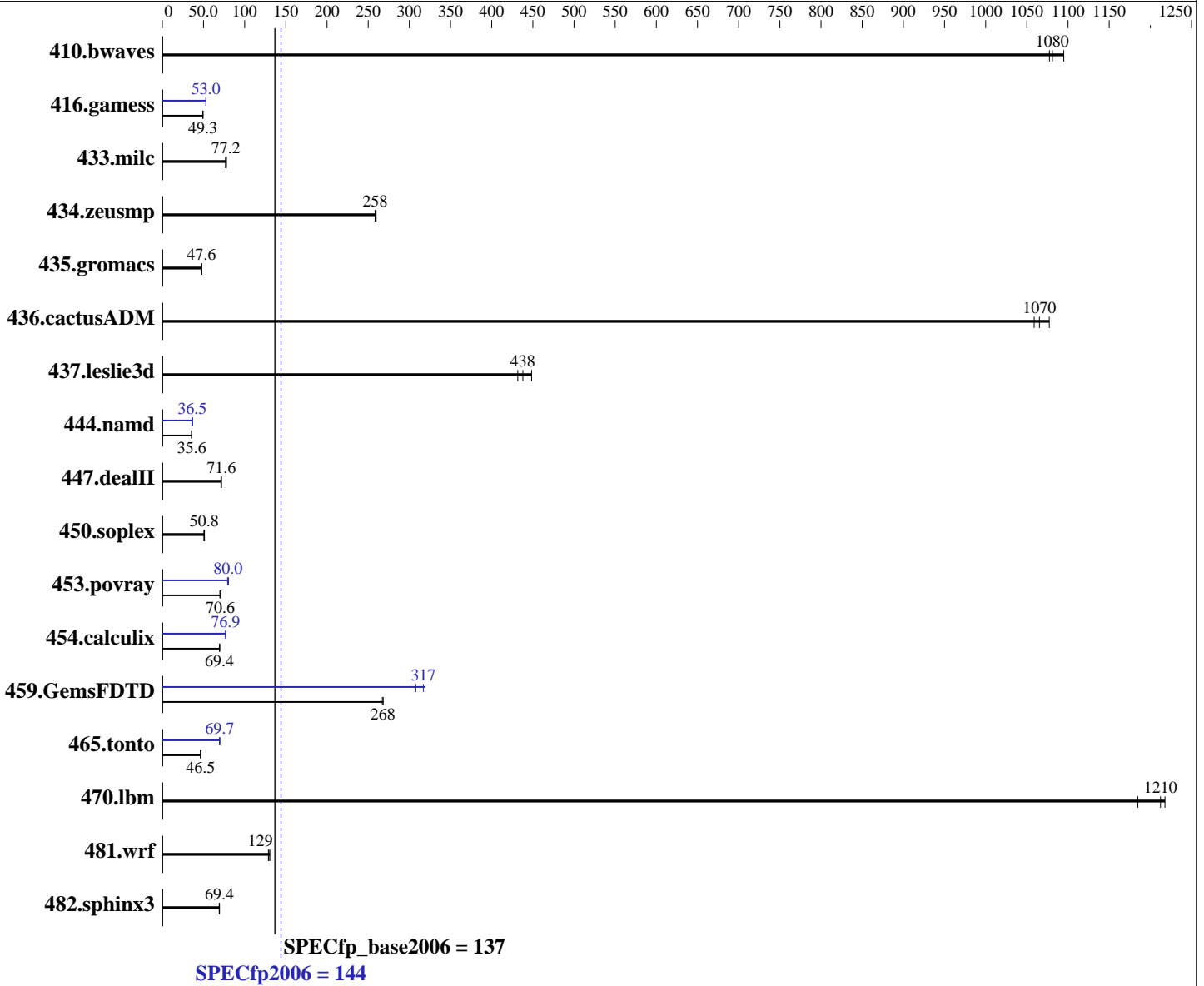| SPECfp2006 =	144
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L3 Cache:	22 MB I+D on chip per chip
Other Cache:	None
Memory:	384 GB (12 x 32 GB 2Rx4 PC4-2666V-R)
Disk Subsystem:	1 x 800 GB SATA SSD
Other Hardware:	None

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	12.4	1090	**12.6**	**1080**	12.6	1080	12.4	1090	**12.6**	**1080**	12.6	1080
416.gamess	**397**	**49.3**	397	49.3	398	49.2	369	53.1	**369**	**53.0**	370	52.9
433.milc	120	76.7	**119**	**77.2**	118	77.9	120	76.7	**119**	**77.2**	118	77.9
434.zeusmp	**35.2**	**258**	35.1	260	35.2	258	**35.2**	**258**	35.1	260	35.2	258
435.gromacs	**150**	**47.6**	151	47.4	149	47.8	**150**	**47.6**	151	47.4	149	47.8
436.cactusADM	11.1	1080	**11.2**	**1070**	11.3	1060	11.1	1080	**11.2**	**1070**	11.3	1060
437.leslie3d	21.8	432	21.0	448	**21.5**	**438**	21.8	432	21.0	448	**21.5**	**438**
444.namd	225	35.7	**225**	**35.6**	225	35.6	**220**	**36.5**	220	36.5	220	36.5
447.dealII	159	71.7	161	71.2	**160**	**71.6**	159	71.7	161	71.2	**160**	**71.6**
450.soplex	163	51.2	165	50.5	**164**	**50.8**	163	51.2	165	50.5	**164**	**50.8**
453.povray	76.2	69.9	74.8	71.1	**75.3**	**70.6**	66.3	80.3	67.1	79.2	**66.5**	**80.0**
454.calculix	118	69.8	119	69.4	**119**	**69.4**	107	76.7	107	77.0	**107**	**76.9**
459.GemsFDTD	**39.6**	**268**	39.9	266	39.6	268	34.5	308	**33.5**	**317**	33.2	319
465.tonto	212	46.5	212	46.5	**212**	**46.5**	141	69.6	**141**	**69.7**	141	69.7
470.lbm	11.6	1180	11.3	1220	**11.3**	**1210**	11.6	1180	11.3	1220	**11.3**	**1210**
481.wrf	**86.3**	**129**	86.7	129	85.5	131	**86.3**	**129**	86.7	129	85.5	131
482.sphinx3	**281**	**69.4**	282	69.1	281	69.4	**281**	**69.4**	282	69.1	281	69.4

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
    Uncore Frequency Scaling 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 linux-g50d Thu Aug  3 08:05:54 2017

     This section contains SUT (System Under Test) info as seen by
```
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Hardware Availability: Aug-2017

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Platform Notes (Continued)

```
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 6130 CPU @ 2.10GHz
      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 : 16
      siblings  : 16
      physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
      physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
   cache size : 22528 KB

From /proc/meminfo
   MemTotal:       395882580 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 linux-g50d 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 3 07:57

SPEC is set to: /home/cpu2006-1.2-ic17.0
   Filesystem      Type   Size   Used Avail Use% Mounted on
   /dev/sda2       btrfs  744G   172G  571G  24% /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
```

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Platform Notes (Continued)

```
    hardware, firmware, and the "DMTF SMBIOS" standard.

    BIOS Lenovo -[TEE105Z-1.00]- 04/27/2017
    Memory:
    12x Hynix HMA84GR7AFR4N-VK 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:
KMP_AFFINITY = "granularity=fine,compact"
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"
OMP_NUM_THREADS = "32"

  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.
```

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
```

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Base Portability Flags (Continued)

```
    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
```

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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

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

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