SPEC® CFP2006 Result

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Lenovo Group Limited

Lenovo System x3550 m5
(2.20 GHz, Intel Xeon E5-2630 v4)
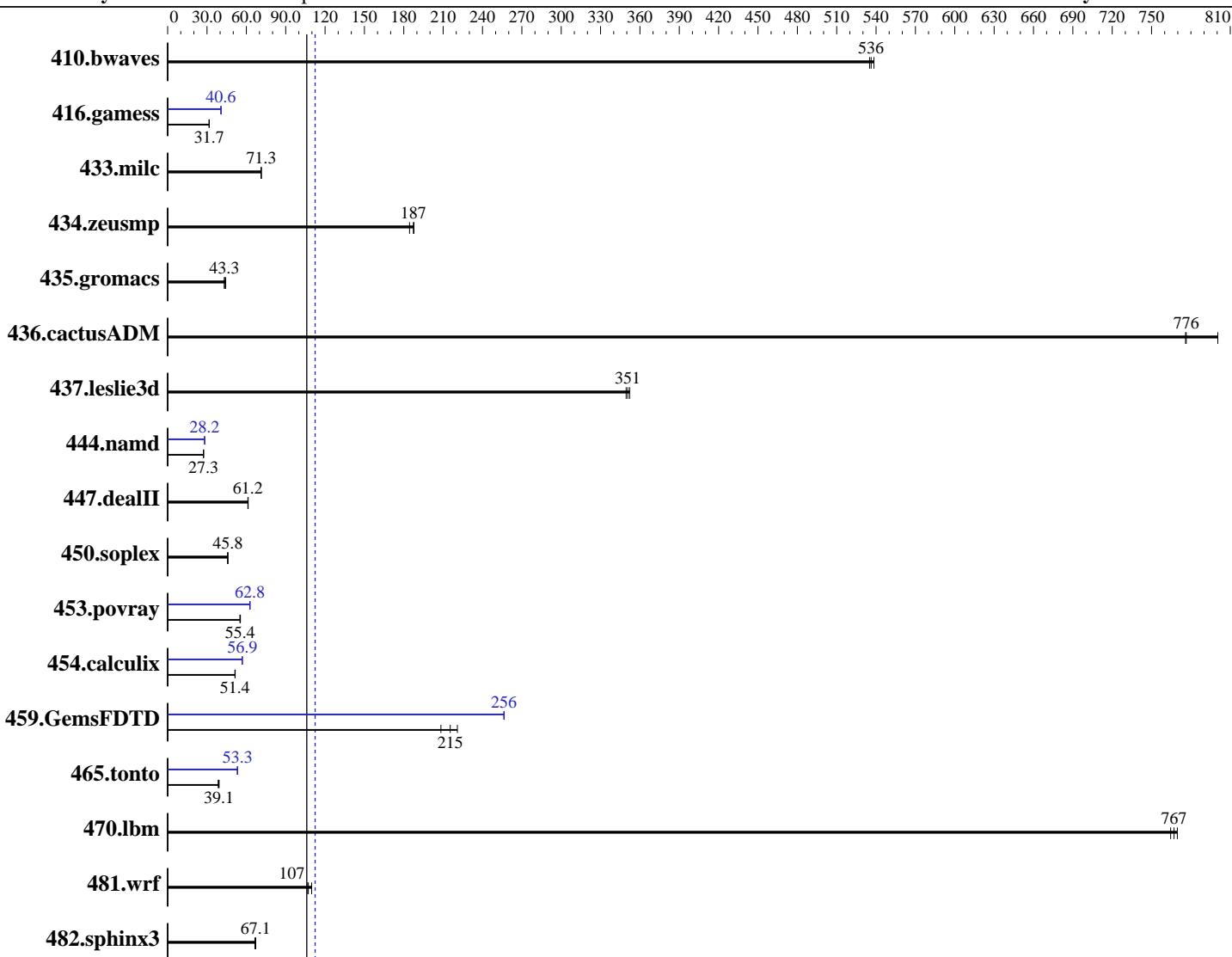
$SPECfp^{®}2006 = $ 112

$SPECfp_base2006 = $ 106

CPU2006 license: 9017	**Test date:** Apr-2016
Test sponsor: Lenovo Group Limited	**Hardware Availability:** Mar-2016
Tested by: Lenovo Group Limited	**Software Availability:** Dec-2015

410.bwaves 536

416.gamess 40.6 / 31.7

433.milc 71.3

434.zeusmp 187

435.gromacs 43.3

436.cactusADM 776

437.leslie3d 351

444.namd 28.2 / 27.3

447.dealII 61.2

450.soplex 45.8

453.povray 62.8 / 55.4

454.calculix 56.9 / 51.4

459.GemsFDTD 256 / 215

465.tonto 53.3 / 39.1

470.lbm 767

481.wrf 107

482.sphinx3 67.1

SPECfp_base2006 = 106

SPECfp2006 = 112

Hardware

CPU Name:	Intel Xeon E5-2630 v4
CPU Characteristics:	Intel Turbo Boost Technology up to 3.10 GHz
CPU MHz:	2200
FPU:	Integrated
CPU(s) enabled:	20 cores, 2 chips, 10 cores/chip
CPU(s) orderable:	1,2 chips
Primary Cache:	32 KB I + 32 KB D on chip per core
Secondary Cache:	256 KB I+D on chip per core

Continued on next page

Software

Operating System:	SUSE Linux Enterprise Server 12 (x86_64) Kernel 3.12.28-4-default
Compiler:	C/C++: Version 16.0.0.101 of Intel C++ Studio XE for Linux
Auto Parallel:	Yes
File System:	xfs
System State:	Run level 3 (multi-user)
Base Pointers:	32-bit
Peak Pointers:	32/64-bit

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L3 Cache:	25 MB I+D on chip per chip	Other Software:	None
Other Cache:	None		
Memory:	256 GB (16 x 16 GB 2Rx4 PC4-2400T-R, running at 2133 MHz)		
Disk Subsystem:	1 x 800 GB SATA SSD		
Other Hardware:	None		

Results Table

Benchmark	Base						Peak					
	Seconds	**Ratio**	**Seconds**	**Ratio**	**Seconds**	**Ratio**	**Seconds**	**Ratio**	**Seconds**	**Ratio**	**Seconds**	**Ratio**
410.bwaves	25.4	535	**25.3**	**536**	25.2	538	25.4	535	**25.3**	**536**	25.2	538
416.gamess	618	31.7	**618**	**31.7**	620	31.6	482	40.6	**482**	**40.6**	481	40.7
433.milc	**129**	**71.3**	129	71.3	129	71.3	**129**	**71.3**	129	71.3	129	71.3
434.zeusmp	**48.6**	**187**	48.5	188	49.3	184	**48.6**	**187**	48.5	188	49.3	184
435.gromacs	**165**	**43.3**	165	43.2	161	44.3	**165**	**43.3**	165	43.2	161	44.3
436.cactusADM	**15.4**	**776**	15.4	776	14.9	800	**15.4**	**776**	15.4	776	14.9	800
437.leslie3d	26.9	349	26.7	352	**26.8**	**351**	26.9	349	26.7	352	**26.8**	**351**
444.namd	293	27.3	293	27.3	**293**	**27.3**	285	28.1	285	28.2	**285**	**28.2**
447.dealII	**187**	**61.2**	187	61.2	186	61.4	**187**	**61.2**	187	61.2	186	61.4
450.soplex	**182**	**45.8**	182	45.9	182	45.7	**182**	**45.8**	182	45.9	182	45.7
453.povray	96.6	55.1	**96.1**	**55.4**	95.9	55.5	85.0	62.6	**84.8**	**62.8**	84.7	62.8
454.calculix	160	51.5	**161**	**51.4**	161	51.3	145	57.0	**145**	**56.9**	145	56.8
459.GemsFDTD	**49.3**	**215**	50.9	208	48.0	221	**41.4**	**256**	41.4	256	41.3	257
465.tonto	256	38.5	251	39.2	**252**	**39.1**	**185**	**53.3**	185	53.1	185	53.3
470.lbm	18.0	765	17.9	770	**17.9**	**767**	18.0	765	17.9	770	**17.9**	**767**
481.wrf	105	107	102	110	**104**	**107**	105	107	102	110	**104**	**107**
482.sphinx3	290	67.1	**290**	**67.1**	293	66.5	290	67.1	**290**	**67.1**	293	66.5

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
     Intel Hyperthreading set to Disabled
     COD Preference set to Disable
    Sysinfo program /home/cpu2006-1.2-ic16.0/config/sysinfo.rev6914
    $Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
    running on linux-gj7w Thu Apr 21 19:27:21 2016

    This section contains SUT (System Under Test) info as seen by

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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) CPU E5-2630 v4 @ 2.20GHz
      2 "physical id"s (chips)
      20 "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  : 10
      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
   cache size : 25600 KB

From /proc/meminfo
   MemTotal:       263829980 kB
   HugePages_Total:        0
   Hugepagesize:        2048 kB

From /etc/*release* /etc/*version*
   SuSE-release:
      SUSE Linux Enterprise Server 12 (x86_64)
      VERSION = 12
      PATCHLEVEL = 0
      # 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"
      VERSION_ID="12"
      PRETTY_NAME="SUSE Linux Enterprise Server 12"
      ID="sles"
      ANSI_COLOR="0;32"
      CPE_NAME="cpe:/o:suse:sles:12"

uname -a:
   Linux linux-gj7w 3.12.28-4-default #1 SMP Thu Sep 25 17:02:34 UTC 2014
   (9879bd4) x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Apr 21 14:06

SPEC is set to: /home/cpu2006-1.2-ic16.0
   Filesystem      Type  Size  Used Avail Use% Mounted on
   /dev/sda4       xfs   703G   11G  693G   2% /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 -[TBE123H-2.10]- 03/25/2016
   Memory:
   8x NO DIMM Unknown
   16x Samsung M393A2G40DB1-CRC 16 GB 2 rank 2400 MHz, configured at 2133 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-ic16.0/libs/32:/home/cpu2006-1.2-ic16.0/libs/64:/home/cpu2006-1.2-ic16.0/sh"
OMP_NUM_THREADS = "20"

 Binaries compiled on a system with 1x Intel Core i5-4670K CPU + 32GB
 memory using RedHat EL 7.1
 Transparent Huge Pages disabled with:
 echo never > /sys/kernel/mm/transparent_hugepage/enabled
```

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
```

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Base Portability Flags (Continued)

```
     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 -opt-prefetch
-ansi-alias
```

C++ benchmarks:
```
-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -ansi-alias
```

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

Benchmarks using both Fortran and C:
```
-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -opt-prefetch
-ansi-alias
```

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: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)
                -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)
                -par-num-threads=1(pass 1) -prof-use(pass 2) -fno-alias
                -auto-ilp32

     447.dealII: basepeak = yes

    450.soplex: basepeak = yes

    453.povray: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)
                -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)
                -par-num-threads=1(pass 1) -prof-use(pass 2) -unroll4
                -ansi-alias

Fortran benchmarks:

    410.bwaves: basepeak = yes

    416.gamess: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)
                -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)
                -par-num-threads=1(pass 1) -prof-use(pass 2) -unroll2
                -inline-level=0 -scalar-rep-

   434.zeusmp: basepeak = yes

   437.leslie3d: basepeak = yes

459.GemsFDTD: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)
                -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)
                -par-num-threads=1(pass 1) -prof-use(pass 2) -unroll2
                -inline-level=0 -opt-prefetch -parallel

     465.tonto: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)
                -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)
                -par-num-threads=1(pass 1) -prof-use(pass 2) -inline-calloc
                -opt-malloc-options=3 -auto -unroll4

Benchmarks using both Fortran and C:

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Software Availability: Dec-2015

Peak Optimization Flags (Continued)

435.gromacs: basepeak = yes

436.cactusADM: basepeak = yes

454.calculix: -xCORE-AVX2 -ipo -O3 -no-prec-div -auto-ilp32 -ansi-alias

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-ic16.0-official-linux64.html
http://www.spec.org/cpu2006/flags/Lenovo-Platform-Flags-V1.2-BDW-B.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/Intel-ic16.0-official-linux64.xml
http://www.spec.org/cpu2006/flags/Lenovo-Platform-Flags-V1.2-BDW-B.xml

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Tested with SPEC CPU2006 v1.2.
Report generated on Tue May 17 16:51:43 2016 by SPEC CPU2006 PS/PDF formatter v6932.
Originally published on 17 May 2016.