SPEC® CFP2006 Result

Lenovo Group Limited

$SPECfp^{®}2006 =$ 117

Lenovo System x3650 M5
(2.10 GHz, Intel Xeon E5-2695 v4)

$SPECfp\_base2006 =$ 110

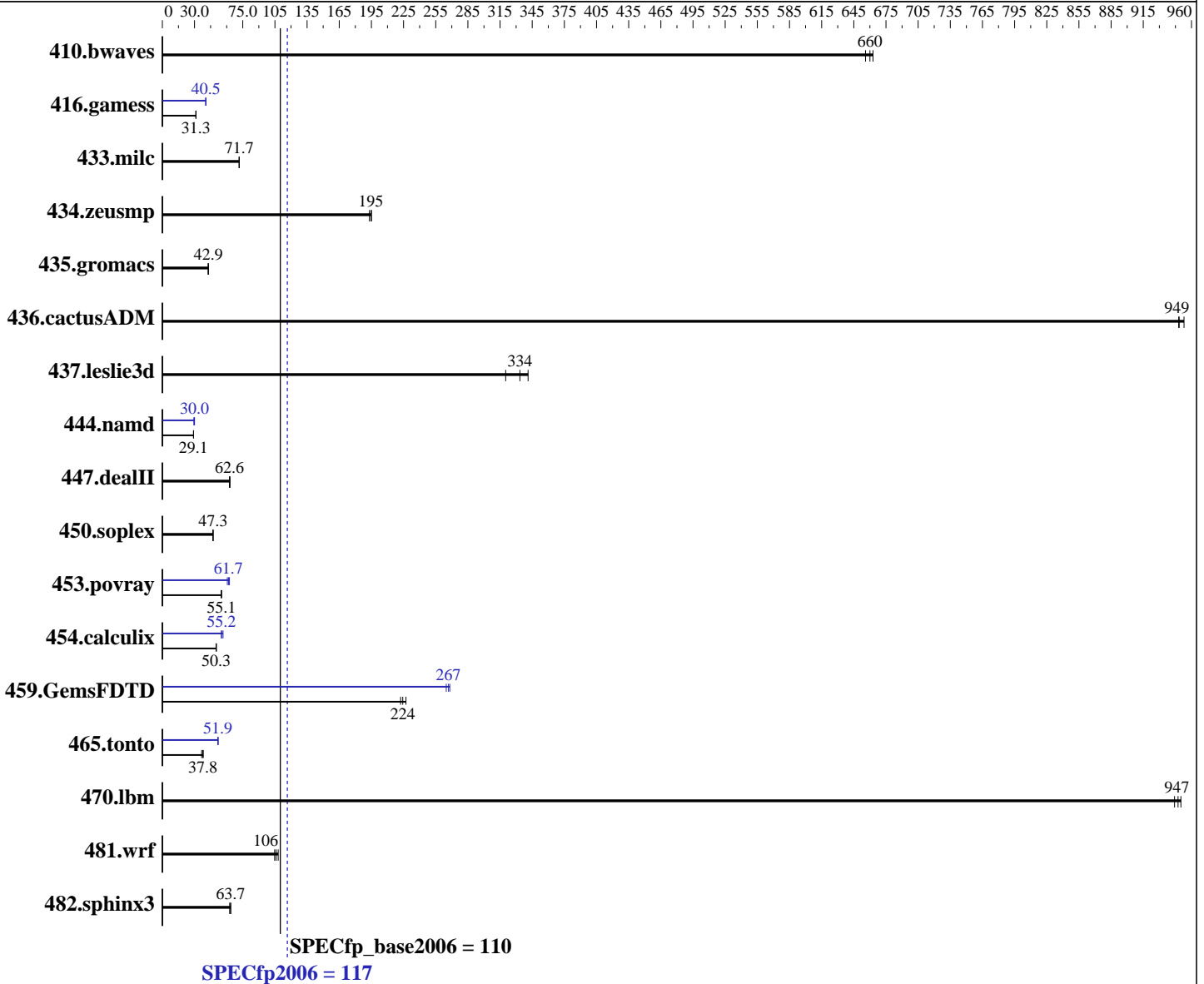Results graph (benchmark values):

- 410.bwaves — 660
- 416.gamess — 40.5 / 31.3
- 433.milc — 71.7
- 434.zeusmp — 195
- 435.gromacs — 42.9
- 436.cactusADM — 949
- 437.leslie3d — 334
- 444.namd — 30.0 / 29.1
- 447.dealII — 62.6
- 450.soplex — 47.3
- 453.povray — 61.7 / 55.1
- 454.calculix — 55.2 / 50.3
- 459.GemsFDTD — 267 / 224
- 465.tonto — 51.9 / 37.8
- 470.lbm — 947
- 481.wrf — 106
- 482.sphinx3 — 63.7

SPECfp_base2006 = 110
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Hardware

CPU Name: Intel Xeon E5-2695 v4
CPU Characteristics: Intel Turbo Boost Technology up to 3.30 GHz
CPU MHz: 2100
FPU: Integrated
CPU(s) enabled: 36 cores, 2 chips, 18 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 SP1 (x86_64) Kernel 3.12.49-11-default
Compiler: C/C++: Version 16.0.0.101 of Intel C++ Studio XE for Linux;
Fortran: Version 16.0.0.101 of Intel Fortran Studio XE for Linux
Auto Parallel: Yes
File System: xfs
System State: Run level 3 (multi-user)

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

L3 Cache:	45 MB I+D on chip per chip	Base Pointers:	64-bit
Other Cache:	None	Peak Pointers:	32/64-bit
Memory:	256 GB (16 x 16 GB 2Rx4 PC4-2400T-R)	Other Software:	None
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	**20.6**	**660**	20.7	656	20.5	663	**20.6**	**660**	20.7	656	20.5	663
416.gamess	625	31.3	624	31.4	**625**	**31.3**	**483**	**40.5**	483	40.5	483	40.5
433.milc	**128**	**71.7**	128	71.6	128	71.7	**128**	**71.7**	128	71.6	128	71.7
434.zeusmp	47.1	193	**46.8**	**195**	46.7	195	47.1	193	**46.8**	**195**	46.7	195
435.gromacs	**166**	**42.9**	167	42.8	166	42.9	**166**	**42.9**	167	42.8	166	42.9
436.cactusADM	12.5	953	12.6	948	**12.6**	**949**	12.5	953	12.6	948	**12.6**	**949**
437.leslie3d	**28.2**	**334**	27.6	341	29.3	320	**28.2**	**334**	27.6	341	29.3	320
444.namd	276	29.1	276	29.1	**276**	**29.1**	**268**	**30.0**	273	29.4	268	30.0
447.dealII	181	63.1	**183**	**62.6**	183	62.5	181	63.1	**183**	**62.6**	183	62.5
450.soplex	176	47.3	**176**	**47.3**	176	47.3	176	47.3	**176**	**47.3**	176	47.3
453.povray	97.0	54.8	**96.6**	**55.1**	96.3	55.2	87.8	60.6	85.0	62.6	**86.2**	**61.7**
454.calculix	165	50.1	**164**	**50.3**	164	50.3	146	56.6	**149**	**55.2**	150	55.1
459.GemsFDTD	47.7	222	46.7	227	**47.3**	**224**	40.1	265	39.6	268	**39.8**	**267**
465.tonto	258	38.1	**260**	**37.8**	269	36.6	189	51.9	**190**	**51.9**	190	51.9
470.lbm	14.5	950	**14.5**	**947**	14.6	944	14.5	950	**14.5**	**947**	14.6	944
481.wrf	103	108	**105**	**106**	107	105	103	108	**105**	**106**	107	105
482.sphinx3	311	62.8	306	63.7	**306**	**63.7**	311	62.8	306	63.7	**306**	**63.7**

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
    Sysinfo program /home/cpu2006-1.2-ic16.0/config/sysinfo.rev6914
    $Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
    running on XinYi-14 Mon May 9 23:28:41 2016

    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

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Test date: May-2016
Hardware Availability: Mar-2016
Software Availability: Dec-2015

Platform Notes (Continued)

```
From /proc/cpuinfo
   model name : Intel(R) Xeon(R) CPU E5-2695 v4 @ 2.10GHz
      2 "physical id"s (chips)
      36 "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 : 18
      siblings  : 18
      physical 0: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 1: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
   cache size : 46080 KB

From /proc/meminfo
   MemTotal:       263958820 kB
   HugePages_Total:        0
   Hugepagesize:        2048 kB

From /etc/*release* /etc/*version*
   SuSE-release:
      SUSE Linux Enterprise Server 12 (x86_64)
      VERSION = 12
      PATCHLEVEL = 1
      # 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-SP1"
      VERSION_ID="12.1"
      PRETTY_NAME="SUSE Linux Enterprise Server 12 SP1"
      ID="sles"
      ANSI_COLOR="0;32"
      CPE_NAME="cpe:/o:suse:sles:12:sp1"

uname -a:
   Linux XinYi-14 3.12.49-11-default #1 SMP Wed Nov 11 20:52:43 UTC 2015
   (8d714a0) x86_64 x86_64 x86_64 GNU/Linux

run-level 3 May 9 18:20

SPEC is set to: /home/cpu2006-1.2-ic16.0
   Filesystem     Type  Size  Used Avail Use% Mounted on
   /dev/sda4      xfs   688G  7.6G  681G   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
   hardware, firmware, and the "DMTF SMBIOS" standard.
```

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Platform Notes (Continued)

```
   BIOS LENOVO -[TCE124I-2.10]- 04/27/2016
   Memory:
   16x Hynix HMA42GR7AFR4N-UH 16 GB 2 rank 2400 MHz
   8x NO DIMM Unknown

 (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 = "36"

 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
     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 -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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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-Settings-V1.2-BDW-revC.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-Settings-V1.2-BDW-revC.xml

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

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