SPEC® CFP2006 Result
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Lenovo Group Limited

$SPECfp^{®}2006 =$ 76.7

Lenovo System x3550 M5
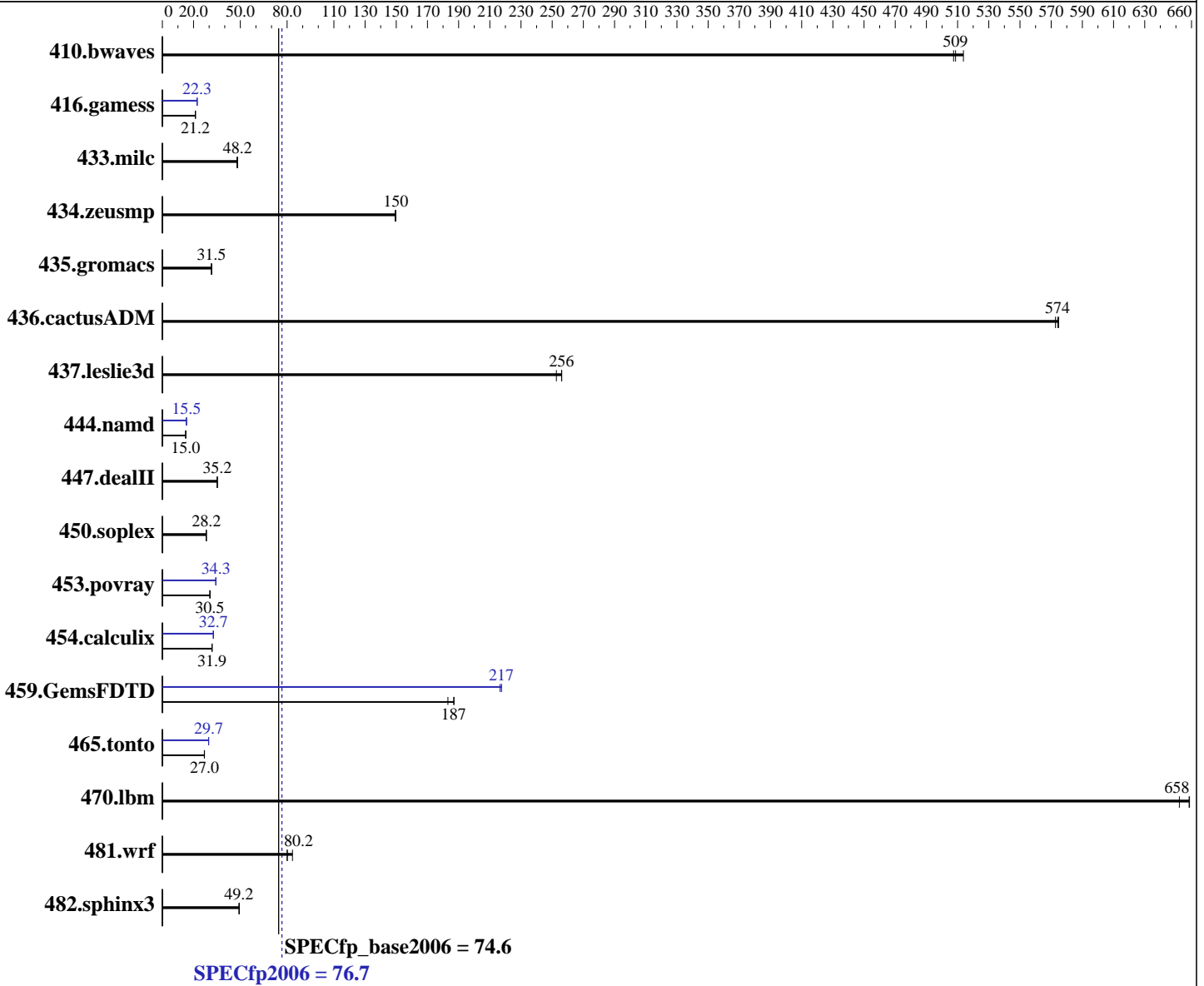(1.70 GHz, Intel Xeon E5-2609 v4)

$SPECfp\_base2006 =$ 74.6

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

0 20.0   50.0   80.0   110 130 150 170 190 210 230 250 270 290 310 330 350 370 390 410 430 450 470 490 510 530 550 570 590 610 630 660

- 410.bwaves — 509
- 416.gamess — 22.3 / 21.2
- 433.milc — 48.2
- 434.zeusmp — 150
- 435.gromacs — 31.5
- 436.cactusADM — 574
- 437.leslie3d — 256
- 444.namd — 15.5 / 15.0
- 447.dealII — 35.2
- 450.soplex — 28.2
- 453.povray — 34.3 / 30.5
- 454.calculix — 32.7 / 31.9
- 459.GemsFDTD — 217 / 187
- 465.tonto — 29.7 / 27.0
- 470.lbm — 658
- 481.wrf — 80.2
- 482.sphinx3 — 49.2

SPECfp_base2006 = 74.6
SPECfp2006 = 76.7

Hardware

CPU Name:	Intel Xeon E5-2609 v4
CPU Characteristics:	
CPU MHz:	1700
FPU:	Integrated
CPU(s) enabled:	16 cores, 2 chips, 8 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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(1.70 GHz, Intel Xeon E5-2609 v4)

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L3 Cache:	20 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, running at 1866 MHz)	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	26.8	507	26.5	514	**26.7**	**509**	26.8	507	26.5	514	**26.7**	**509**
416.gamess	**924**	**21.2**	925	21.2	923	21.2	880	22.3	876	22.4	**879**	**22.3**
433.milc	192	47.8	**191**	**48.2**	191	48.2	192	47.8	**191**	**48.2**	191	48.2
434.zeusmp	**60.8**	**150**	60.8	150	61.0	149	**60.8**	**150**	60.8	150	61.0	149
435.gromacs	**226**	**31.5**	227	31.5	226	31.6	**226**	**31.5**	227	31.5	226	31.6
436.cactusADM	**20.8**	**574**	20.9	573	20.8	575	**20.8**	**574**	20.9	573	20.8	575
437.leslie3d	37.2	253	36.7	256	**36.7**	**256**	37.2	253	36.7	256	**36.7**	**256**
444.namd	536	15.0	**535**	**15.0**	535	15.0	519	15.4	**519**	**15.5**	519	15.5
447.dealII	326	35.1	324	35.3	**325**	**35.2**	326	35.1	324	35.3	**325**	**35.2**
450.soplex	**295**	**28.2**	295	28.2	297	28.1	**295**	**28.2**	295	28.2	297	28.1
453.povray	174	30.5	174	30.5	**174**	**30.5**	**155**	**34.3**	155	34.3	155	34.4
454.calculix	**259**	**31.9**	259	31.8	259	31.9	**252**	**32.7**	252	32.7	252	32.7
459.GemsFDTD	56.7	187	57.9	183	**56.8**	**187**	49.0	217	48.8	218	**48.8**	**217**
465.tonto	366	26.9	364	27.0	**365**	**27.0**	**331**	**29.7**	332	29.7	331	29.7
470.lbm	21.1	652	20.9	659	**20.9**	**658**	21.1	652	20.9	659	**20.9**	**658**
481.wrf	140	80.0	**139**	**80.2**	134	83.4	140	80.0	**139**	**80.2**	134	83.4
482.sphinx3	395	49.4	396	49.2	**396**	**49.2**	395	49.4	396	49.2	**396**	**49.2**

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
    Sysinfo program /home/cpu2006-1.2-ic16.0/config/sysinfo.rev6914
    $Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
    running on DaAn-01 Thu Jun 2 02:41:09 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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CPU2006 license: 9017
Test sponsor: Lenovo Group Limited
Tested by: Lenovo Group Limited

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

Platform Notes (Continued)

```
From /proc/cpuinfo
   model name : Intel(R) Xeon(R) CPU E5-2609 v4 @ 1.70GHz
      2 "physical id"s (chips)
      16 "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  : 8
      physical 0: cores 0 1 2 3 4 5 6 7
      physical 1: cores 0 1 2 3 4 5 6 7
   cache size : 20480 KB

From /proc/meminfo
   MemTotal:        263830304 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 DaAn-01 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 Jun 2 02:38

SPEC is set to: /home/cpu2006-1.2-ic16.0
   Filesystem     Type   Size  Used Avail Use% Mounted on
   /dev/sda4      xfs    688G   28G  661G   5% /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 -[TBE124K-2.10]- 05/10/2016
   Memory:
   16x Hynix HMA42GR7AFR4N-UH 16 GB 2 rank 2400 MHz, configured at 1867 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 = "16"

 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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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-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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