SPEC® CFP2006 Result
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Lenovo Group Limited

Lenovo System x3550 M5
(Intel Xeon E5-2650 v3, 3.00 GHz)

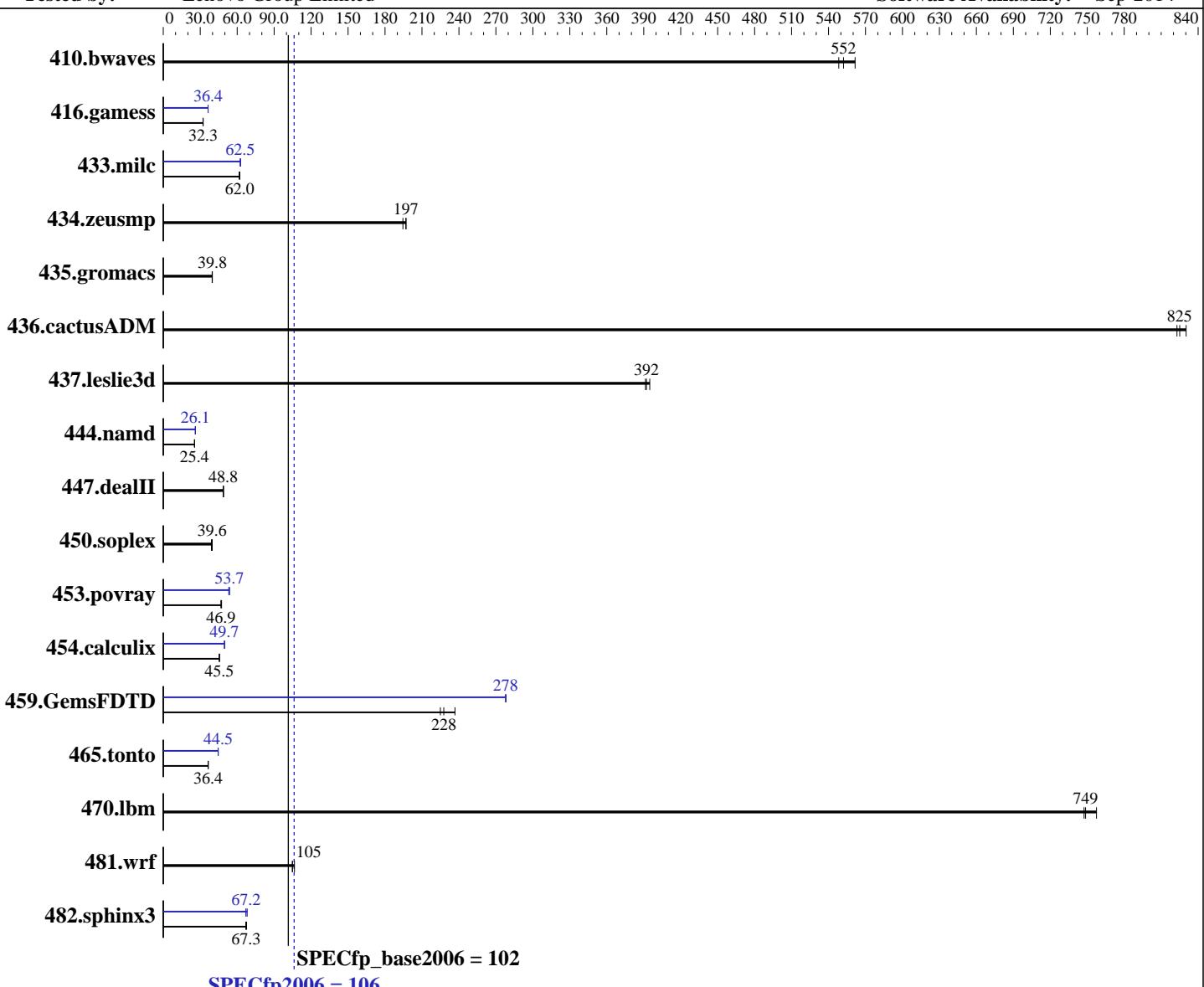$SPECfp^{®}2006 =$ 106

$SPECfp\_base2006 =$ 102

CPU2006 license:	9017	**Test date:**	Feb-2015
Test sponsor:	Lenovo Group Limited	**Hardware Availability:**	Oct-2014
Tested by:	Lenovo Group Limited	**Software Availability:**	Sep-2014

410.bwaves 552
416.gamess 36.4 / 32.3
433.milc 62.5 / 62.0
434.zeusmp 197
435.gromacs 39.8
436.cactusADM 825
437.leslie3d 392
444.namd 26.1 / 25.4
447.dealII 48.8
450.soplex 39.6
453.povray 53.7 / 46.9
454.calculix 49.7 / 45.5
459.GemsFDTD 278 / 228
465.tonto 44.5 / 36.4
470.lbm 749
481.wrf 105
482.sphinx3 67.2 / 67.3

SPECfp_base2006 = 102
SPECfp2006 = 106

Hardware

CPU Name:	Intel Xeon E5-2650 v3
CPU Characteristics:	Intel Turbo Boost Technology up to 3.00 GHz
CPU MHz:	2300
FPU:	Integrated
CPU(s) enabled:	20 cores, 2 chips, 10 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:	256 KB I+D on chip per core

Continued on next page

Software

Operating System:	Red Hat Enterprise Linux Server release 7.0 (Maipo)
	3.10.0-123.el7.x86_64
Compiler:	C/C++: Version 15.0.0.090 of Intel C++ Studio XE for Linux;
	Fortran: Version 15.0.0.090 of Intel Fortran Studio XE for Linux
Auto Parallel:	Yes
File System:	xfs

Continued on next page

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L3 Cache:	25 MB I+D on chip per chip	System State:	Run level 3 (multi-user)
Other Cache:	None	Base Pointers:	64-bit
Memory:	256 GB (16 x 16 GB 2Rx4 PC4-2133P-R)	Peak Pointers:	32/64-bit
Disk Subsystem:	1 x 300 GB SAS, 10000 RPM	Other Software:	None
Other Hardware:	None		

Results Table

Benchmark	Base						Peak					
	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	24.2	562	24.8	548	**24.6**	**552**	24.2	562	24.8	548	**24.6**	**552**
416.gamess	605	32.4	607	32.2	**605**	**32.3**	**538**	**36.4**	538	36.4	539	36.3
433.milc	148	62.1	**148**	**62.0**	149	61.6	147	62.4	**147**	**62.5**	146	62.8
434.zeusmp	46.8	195	**46.2**	**197**	46.2	197	46.8	195	**46.2**	**197**	46.2	197
435.gromacs	180	39.7	**179**	**39.8**	179	39.8	180	39.7	**179**	**39.8**	179	39.8
436.cactusADM	14.4	830	14.5	823	**14.5**	**825**	14.4	830	14.5	823	**14.5**	**825**
437.leslie3d	**24.0**	**392**	24.0	391	23.8	395	**24.0**	**392**	24.0	391	23.8	395
444.namd	316	25.4	**316**	**25.4**	316	25.4	308	26.0	308	26.1	**308**	**26.1**
447.dealII	235	48.7	**234**	**48.8**	234	48.9	235	48.7	**234**	**48.8**	234	48.9
450.soplex	213	39.1	210	39.7	**211**	**39.6**	213	39.1	210	39.7	**211**	**39.6**
453.povray	113	46.9	112	47.3	**113**	**46.9**	99.0	53.8	100	53.1	**99.0**	**53.7**
454.calculix	181	45.6	181	45.5	**181**	**45.5**	165	50.0	**166**	**49.7**	166	49.6
459.GemsFDTD	**46.6**	**228**	47.2	225	44.8	237	38.2	278	**38.2**	**278**	38.1	278
465.tonto	270	36.4	**270**	**36.4**	270	36.5	221	44.5	220	44.6	**221**	**44.5**
470.lbm	18.4	747	**18.4**	**749**	18.1	758	18.4	747	**18.4**	**749**	18.1	758
481.wrf	105	106	**106**	**105**	107	105	105	106	**106**	**105**	107	105
482.sphinx3	**290**	**67.3**	288	67.6	291	67.0	286	68.2	291	67.1	**290**	**67.2**

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 setting:
Operating Mode set to "Efficiency-Favor Performance"
Sysinfo program /home/SPEC/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
running on x3550m5 Thu Feb  5 12:03:59 2015

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 sponsor: Lenovo Group Limited
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Test date: Feb-2015
Hardware Availability: Oct-2014
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Platform Notes (Continued)

```
From /proc/cpuinfo
   model name : Intel(R) Xeon(R) CPU E5-2650 v3 @ 2.30GHz
      2 "physical id"s (chips)
      40 "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  : 20
      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:      263632140 kB
   HugePages_Total:        0
   Hugepagesize:        2048 kB

From /etc/*release* /etc/*version*
   os-release:
      NAME="Red Hat Enterprise Linux Server"
      VERSION="7.0 (Maipo)"
      ID="rhel"
      ID_LIKE="fedora"
      VERSION_ID="7.0"
      PRETTY_NAME="Red Hat Enterprise Linux Server 7.0 (Maipo)"
      ANSI_COLOR="0;31"
      CPE_NAME="cpe:/o:redhat:enterprise_linux:7.0:GA:server"
   redhat-release: Red Hat Enterprise Linux Server release 7.0 (Maipo)
   system-release: Red Hat Enterprise Linux Server release 7.0 (Maipo)
   system-release-cpe: cpe:/o:redhat:enterprise_linux:7.0:ga:server

uname -a:
   Linux x3550m5 3.10.0-123.el7.x86_64 #1 SMP Mon May 5 11:16:57 EDT 2014 x86_64
   x86_64 x86_64 GNU/Linux

run-level 3 Feb 5 12:01

SPEC is set to: /home/SPEC
   Filesystem            Type  Size  Used Avail Use% Mounted on
   /dev/mapper/rhel-root xfs   275G   84G  191G  31% /
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 IBM -[TBE103AUS-1.01]- 10/23/2014
   Memory:
   14x Hynix 484D4134324752374D4652344E2D54462020 16 GB 2 rank 2133 MHz
   2x Hynix 484D4134324752374D4652344E2D54465431 16 GB 2 rank 2133 MHz
```

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Platform Notes (Continued)

```
      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,1,0"
LD_LIBRARY_PATH = "/home/SPEC/libs/32:/home/SPEC/libs/64:/home/SPEC/sh"
OMP_NUM_THREADS = "20"

 Binaries compiled on a system with 1x Core i5-4670K CPU + 16GB
 memory using RedHat EL 7.0
 Transparent Huge Pages enabled with:
 echo always > /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
   454.calculix: -DSPEC_CPU_LP64 -nofor_main
  459.GemsFDTD: -DSPEC_CPU_LP64
     465.tonto: -DSPEC_CPU_LP64
```

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Base Portability Flags (Continued)

```
    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
```

Peak Optimization Flags

C benchmarks:

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Peak Optimization Flags (Continued)

```
      433.milc: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)
                -O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2)
                -auto-ilp32 -ansi-alias

      470.lbm: basepeak = yes

   482.sphinx3: -xCORE-AVX2 -ipo -O3 -no-prec-div -unroll2 -ansi-alias
                -parallel
```

C++ benchmarks:

```
      444.namd: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)
                -O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2)
                -fno-alias -auto-ilp32

    447.dealII: basepeak = yes

    450.soplex: basepeak = yes

    453.povray: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)
                -O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2) -unroll4
                -ansi-alias
```

Fortran benchmarks:

```
    410.bwaves: basepeak = yes

    416.gamess: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)
                -O3(pass 2) -no-prec-div(pass 2) -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(pass 1) -ipo(pass 2)
                -O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2) -unroll2
                -inline-level=0 -opt-prefetch -parallel

     465.tonto: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)
                -O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2)
                -inline-calloc -opt-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 -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-ic15.0-official-linux64.html`
`http://www.spec.org/cpu2006/flags/Lenovo-Platform-Flags-V1.2-HSW-B.20141230.html`

You can also download the XML flags sources by saving the following links:
`http://www.spec.org/cpu2006/flags/Intel-ic15.0-official-linux64.xml`
`http://www.spec.org/cpu2006/flags/Lenovo-Platform-Flags-V1.2-HSW-B.20141230.xml`

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

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