# SPEC® CFP2006 Result

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## Lenovo Group Limited

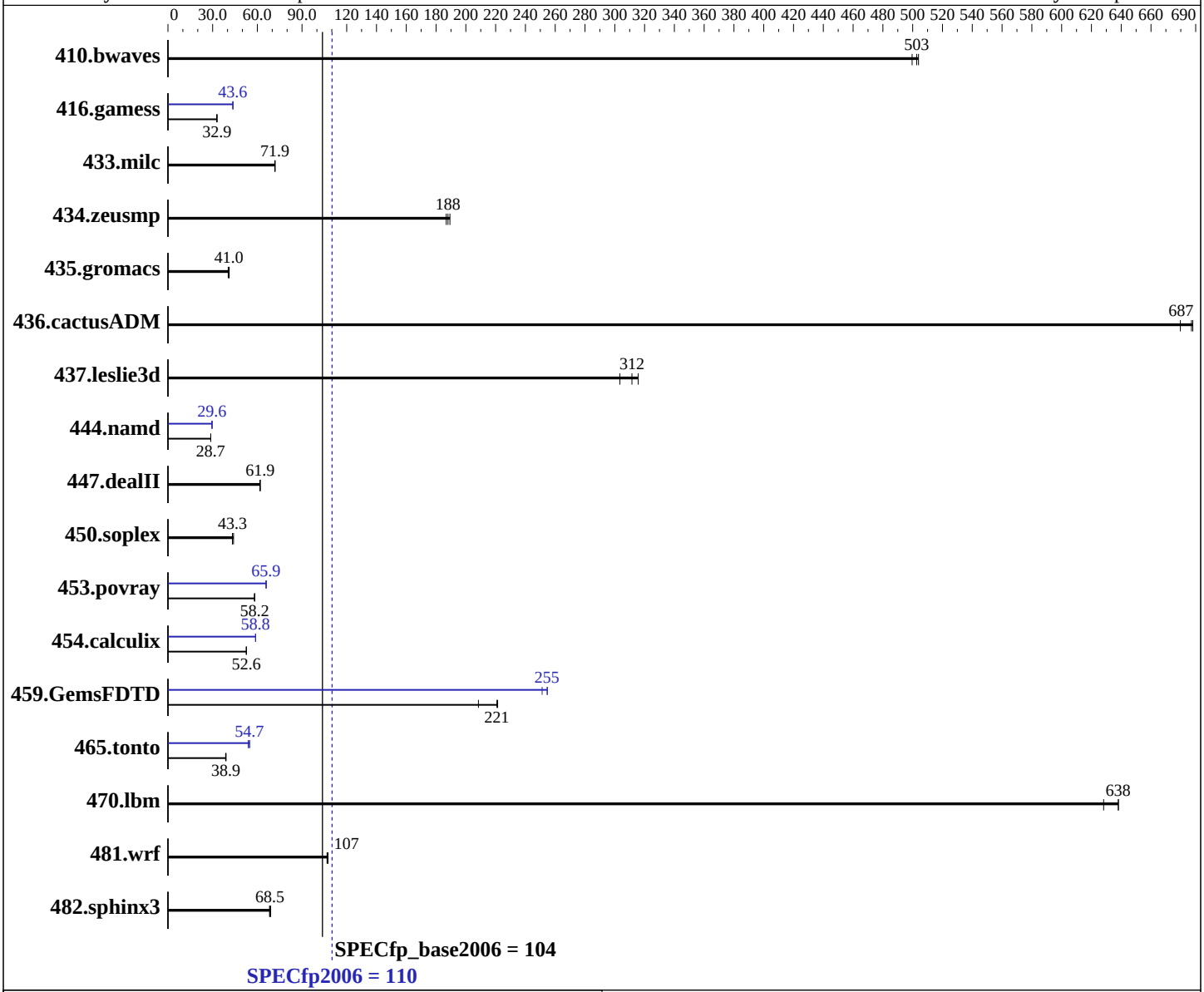
Lenovo System x3500 M5
(Intel Xeon E5-2618L v3, 2.30 GHz)

SPECfp®2006 = 110

SPECfp_base2006 = 104

**CPU2006 license:** 9017
**Test sponsor:** Lenovo Group Limited
**Tested by:** Lenovo Group Limited

**Test date:** Sep-2015
**Hardware Availability:** Jan-2015
**Software Availability:** Sep-2014




## Hardware

| | |
|---|---|
| CPU Name: | Intel Xeon E5-2618L v3 |
| CPU Characteristics: | Intel Turbo Boost Technology up to 3.40 GHz |
| CPU MHz: | 2300 |
| FPU: | Integrated |
| CPU(s) enabled: | 16 cores, 2 chips, 8 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 |

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## Software

| | |
|---|---|
| Operating System: | Red Hat Enterprise Linux Server release 7.0 (Maipo)<br>3.10.0-123.el7.x86_64 |
| Compiler: | C/C++: Version 16.0.0.0 of Intel C++ Studio XE for Linux;<br>Fortran: Version 16.0.0.0 of Intel Fortran Studio XE for Linux |
| Auto Parallel: | Yes |
| File System: | xfs |

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L3 Cache: 20 MB I+D on chip per chip
Other Cache: None
Memory: 256 GB (16 x 16 GB 2Rx4 PC4-2133P-R, running at 1866 MHz)
Disk Subsystem: 1 x 960 GB SATA SSD
Other Hardware: None

System State: Run level 3 (multi-user)
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 | 27.2 | 500 | **27.0** | **503** | 27.0 | 504 | 27.2 | 500 | **27.0** | **503** | 27.0 | 504 |
| 416.gamess | **595** | **32.9** | 597 | 32.8 | 595 | 32.9 | 449 | 43.6 | 449 | 43.6 | **449** | **43.6** |
| 433.milc | 128 | 71.9 | 128 | 71.8 | **128** | **71.9** | 128 | 71.9 | 128 | 71.8 | **128** | **71.9** |
| 434.zeusmp | **48.4** | **188** | 48.1 | 189 | 48.7 | 187 | **48.4** | **188** | 48.1 | 189 | 48.7 | 187 |
| 435.gromacs | **174** | **41.0** | 177 | 40.4 | 174 | 41.1 | **174** | **41.0** | 177 | 40.4 | 174 | 41.1 |
| 436.cactusADM | **17.4** | **687** | 17.4 | 688 | 17.6 | 680 | **17.4** | **687** | 17.4 | 688 | 17.6 | 680 |
| 437.leslie3d | **30.2** | **312** | 31.0 | 303 | 29.8 | 316 | **30.2** | **312** | 31.0 | 303 | 29.8 | 316 |
| 444.namd | 279 | 28.7 | 279 | 28.7 | **279** | **28.7** | **271** | **29.6** | 271 | 29.6 | 271 | 29.6 |
| 447.dealII | 185 | 61.9 | **185** | **61.9** | 185 | 61.9 | 185 | 61.9 | **185** | **61.9** | 185 | 61.9 |
| 450.soplex | 193 | 43.3 | 189 | 44.0 | **192** | **43.3** | 193 | 43.3 | 189 | 44.0 | **192** | **43.3** |
| 453.povray | 91.7 | 58.0 | **91.4** | **58.2** | 91.2 | 58.4 | **80.7** | **65.9** | 80.8 | 65.8 | 80.6 | 66.0 |
| 454.calculix | 157 | 52.7 | **157** | **52.6** | 157 | 52.6 | **140** | **58.8** | 140 | 58.9 | 140 | 58.8 |
| 459.GemsFDTD | **48.0** | **221** | 50.9 | 208 | 47.9 | 221 | **41.7** | **255** | 41.6 | 255 | 42.2 | 251 |
| 465.tonto | **253** | **38.9** | 252 | 39.0 | 254 | 38.7 | 180 | 54.8 | **180** | **54.7** | 183 | 53.9 |
| 470.lbm | 21.5 | 638 | 21.9 | 628 | **21.5** | **638** | 21.5 | 638 | 21.9 | 628 | **21.5** | **638** |
| 481.wrf | **104** | **107** | 104 | 107 | 105 | 107 | **104** | **107** | 104 | 107 | 105 | 107 |
| 482.sphinx3 | 286 | 68.2 | **285** | **68.5** | 283 | 69.0 | 286 | 68.2 | **285** | **68.5** | 283 | 69.0 |

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"
Hyper-threading set to "Enable"
Sysinfo program /home/SPEC_ic16/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
running on x3500M5 Tue Sep 29 13:43:57 2015

This section contains SUT (System Under Test) info as seen by
some common utilities.  To remove or add to this section, see:
```

Continued on next page

## Platform Notes (Continued)

```
      http://www.spec.org/cpu2006/Docs/config.html#sysinfo

    From /proc/cpuinfo
       model name : Intel(R) Xeon(R) CPU E5-2618L v3 @ 2.30GHz
          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 : 8
          siblings  : 16
          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:       263455828 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 x3500M5 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


    SPEC is set to: /home/SPEC_ic16
       Filesystem            Type  Size  Used Avail Use% Mounted on
       /dev/mapper/rhel-root xfs   927G  149G  779G  16% /
    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 -[TAE105J-1.10]- 04/20/2015
      Memory:
       6x Hynix HMA42GR7MFR4N-TF 16 GB 2 rank 2133 MHz, configured at 1866 MHz
```

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## Platform Notes (Continued)

```
      10x Hynix HMA42GR7MFR4N-TFT1 16 GB 2 rank 2133 MHz, configured at 1866 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,1,0"
LD_LIBRARY_PATH = "/home/SPEC_ic16/libs/32:/home/SPEC_ic16/libs/64:/home/SPEC_ic16/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 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

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## Base Portability Flags (Continued)

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

# 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:

Continued on next page

# 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-HSW-D.20150923.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-HSW-D.20150923.xml`


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