



# SPEC® CFP2006 Result

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## Lenovo Group Limited

### SPECfp®\_rate2006 = 582

Lenovo NeXtScale nx360 M5  
(Intel Xeon E5-2630 v3, 2.40 GHz)

### SPECfp\_rate\_base2006 = 568

CPU2006 license: 9017

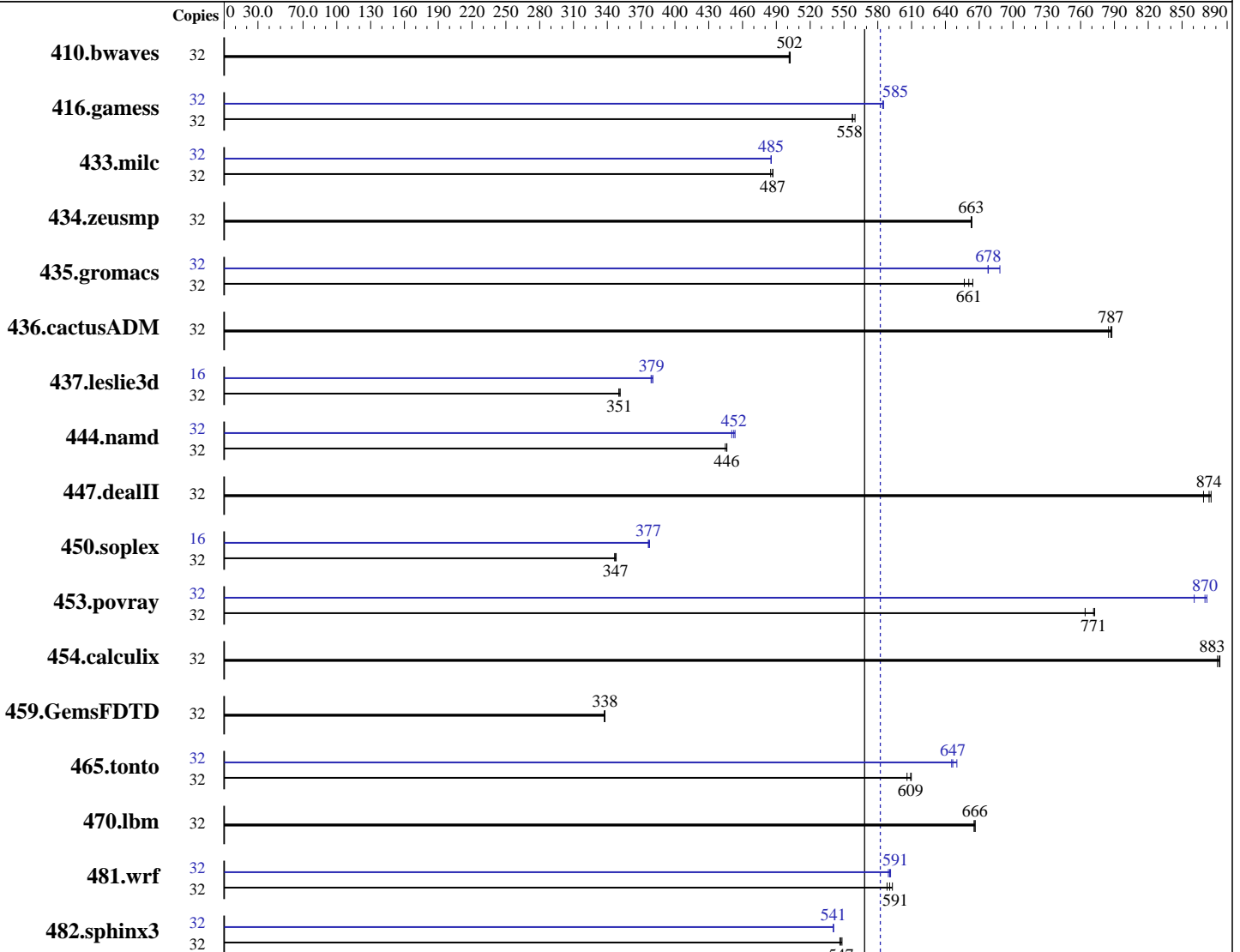
Test date: Feb-2015

Test sponsor: Lenovo Group Limited

Hardware Availability: Nov-2014

Tested by: Lenovo Group Limited

Software Availability: Sep-2014



SPECfp\_rate\_base2006 = 568

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### Hardware

CPU Name: Intel Xeon E5-2630 v3  
 CPU Characteristics: Intel Turbo Boost Technology up to 3.20 GHz  
 CPU MHz: 2400  
 FPU: Integrated  
 CPU(s) enabled: 16 cores, 2 chips, 8 cores/chip, 2 threads/core  
 CPU(s) orderable: 1,2 chip  
 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)  
 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: No  
 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 250 GB 7200 RPM SATA  
Other Hardware: None

System State: Run level 3 (multi-user)  
Base Pointers: 32/64-bit  
Peak Pointers: 32/64-bit  
Other Software: None

## Results Table

| Benchmark     | Base   |             |            |             |            |             |            |        | Peak        |            |            |            |             |            |  |  |
|---------------|--------|-------------|------------|-------------|------------|-------------|------------|--------|-------------|------------|------------|------------|-------------|------------|--|--|
|               | Copies | Seconds     | Ratio      | Seconds     | Ratio      | Seconds     | Ratio      | Copies | Seconds     | Ratio      | Seconds    | Ratio      | Seconds     | Ratio      |  |  |
| 410.bwaves    | 32     | 867         | 501        | <b>867</b>  | <b>502</b> | 866         | 502        | 32     | 867         | 501        | <b>867</b> | <b>502</b> | 866         | 502        |  |  |
| 416.gamess    | 32     | 1119        | 560        | <b>1124</b> | <b>558</b> | 1124        | 557        | 32     | <b>1071</b> | <b>585</b> | 1072       | 584        | 1071        | 585        |  |  |
| 433.milc      | 32     | 606         | 485        | 603         | 487        | <b>603</b>  | <b>487</b> | 32     | 605         | 485        | <b>605</b> | <b>485</b> | 605         | 486        |  |  |
| 434.zeusmp    | 32     | 439         | 663        | <b>439</b>  | <b>663</b> | 439         | 663        | 32     | 439         | 663        | <b>439</b> | <b>663</b> | 439         | 663        |  |  |
| 435.gromacs   | 32     | 344         | 664        | 348         | 657        | <b>346</b>  | <b>661</b> | 32     | <b>337</b>  | <b>678</b> | 337        | 678        | 332         | 688        |  |  |
| 436.cactusADM | 32     | 487         | 785        | <b>486</b>  | <b>787</b> | 485         | 788        | 32     | 487         | 785        | <b>486</b> | <b>787</b> | 485         | 788        |  |  |
| 437.leslie3d  | 32     | <b>858</b>  | <b>351</b> | 856         | 351        | 859         | 350        | 16     | 395         | 380        | <b>396</b> | <b>379</b> | 397         | 379        |  |  |
| 444.namd      | 32     | 577         | 445        | <b>575</b>  | <b>446</b> | 575         | 446        | 32     | <b>567</b>  | <b>452</b> | 570        | 450        | 566         | 453        |  |  |
| 447.dealII    | 32     | 418         | 876        | <b>419</b>  | <b>874</b> | 421         | 869        | 32     | 418         | 876        | <b>419</b> | <b>874</b> | 421         | 869        |  |  |
| 450.soplex    | 32     | 767         | 348        | <b>769</b>  | <b>347</b> | 770         | 346        | 16     | 353         | 377        | 354        | 377        | <b>354</b>  | <b>377</b> |  |  |
| 453.povray    | 32     | <b>221</b>  | <b>771</b> | 220         | 772        | 223         | 764        | 32     | <b>196</b>  | <b>870</b> | 198        | 861        | 195         | 872        |  |  |
| 454.calculix  | 32     | 299         | 884        | 300         | 881        | <b>299</b>  | <b>883</b> | 32     | 299         | 884        | 300        | 881        | <b>299</b>  | <b>883</b> |  |  |
| 459.GemsFDTD  | 32     | <b>1005</b> | <b>338</b> | 1005        | 338        | 1007        | 337        | 32     | <b>1005</b> | <b>338</b> | 1005       | 338        | 1007        | 337        |  |  |
| 465.tonto     | 32     | <b>517</b>  | <b>609</b> | 516         | 610        | 520         | 606        | 32     | <b>487</b>  | <b>647</b> | 484        | 650        | 488         | 646        |  |  |
| 470.lbm       | 32     | 661         | 665        | <b>660</b>  | <b>666</b> | 660         | 666        | 32     | 661         | 665        | <b>660</b> | <b>666</b> | 660         | 666        |  |  |
| 481.wrf       | 32     | 608         | 588        | <b>605</b>  | <b>591</b> | 603         | 593        | 32     | <b>605</b>  | <b>591</b> | 606        | 589        | 604         | 591        |  |  |
| 482.sphinx3   | 32     | 1138        | 548        | 1141        | 546        | <b>1139</b> | <b>547</b> | 32     | 1153        | 541        | 1154       | 540        | <b>1154</b> | <b>541</b> |  |  |

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

## Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl commands to bind each copy to a specific processor. For details, please see the config file.

## Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"

## Platform Notes

Sysinfo program /usr/cpu2006/config/sysinfo.rev6914  
\$Rev: 6914 \$ \$Date:: 2014-06-25 #\$ e3fbb8667b5a285932ceab81e28219e1  
running on wilykat Fri Feb 6 14:52:19 2015

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Software Availability: Sep-2014

### Platform Notes (Continued)

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>

From /proc/cpuinfo

```
model name      : Intel(R) Xeon(R) CPU E5-2630 v3 @ 2.40GHz
 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:      263588692 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 wilykat 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: /usr/cpu2006

```
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sda2        ext4  363G  46G  299G  14% /
```

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 IBM -[THE105F-1.10]- 12/22/2014

Memory:

6x Hynix HMA42GR7MFR4N-TF 16 GB 2 rank 2133 MHz

10x Hynix HMA42GR7MFR4N-TFT1 16 GB 2 rank 2133 MHz

(End of data from sysinfo program)

## General Notes

Environment variables set by runspec before the start of the run:

LD\_LIBRARY\_PATH = "/usr/cpu2006/libs/32:/usr/cpu2006/libs/64:/usr/cpu2006/sh"

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

Filesystem page cache cleared with:

echo 1> /proc/sys/vm/drop\_caches

runspec command invoked through numactl i.e.:

numactl --interleave=all runspec <etc>

## 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 -opt-prefetch -auto-p32
-ansi-alias

```

C++ benchmarks:

```

-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32
-ansi-alias

```

Fortran benchmarks:

```

-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch

```

Benchmarks using both Fortran and C:

```

-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32
-ansi-alias

```

## Peak Compiler Invocation

C benchmarks:

```

icc -m64

```

C++ benchmarks (except as noted below):

```

icpc -m64

```

```

450.soplex: icpc -m32 -L/opt/intel/composer_xe_2015/lib/ia32

```

Fortran benchmarks:

```

ifort -m64

```

Benchmarks using both Fortran and C:

```

icc -m64 ifort -m64

```



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## Peak 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
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

```

## Peak Optimization Flags

C benchmarks:

```

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

470.lbm: basepeak = yes

482.sphinx3: -xCORE-AVX2 -prof-gen(pass 1) -ipo -O3 -no-prec-div
            -prof-use(pass 2) -unroll2

```

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: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)
         -O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2)
         -opt-malloc-options=3

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:

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## Peak Optimization Flags (Continued)

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: -xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch

459.GemsFDTD: basepeak = yes

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) -unroll4  
-auto -inline-calloc -opt-malloc-options=3

Benchmarks using both Fortran and C:

435.gromacs: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)  
-O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2)  
-opt-prefetch -auto-ilp32

436.cactusADM: basepeak = yes

454.calculix: basepeak = yes

481.wrf: -xCORE-AVX2 -ipo -O3 -no-prec-div -auto-ilp32

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>

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For other inquiries, please contact [webmaster@spec.org](mailto:webmaster@spec.org).

Tested with SPEC CPU2006 v1.2.

Report generated on Tue Mar 10 16:00:48 2015 by SPEC CPU2006 PS/PDF formatter v6932.

Originally published on 10 March 2015.