



# SPEC® CFP2006 Result

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## Lenovo Group Limited

### SPECfp®\_rate2006 = 760

Lenovo System x3550 M5  
(Intel Xeon E5-2658 v3, 2.20 GHz)

### SPECfp\_rate\_base2006 = 739

CPU2006 license: 9017

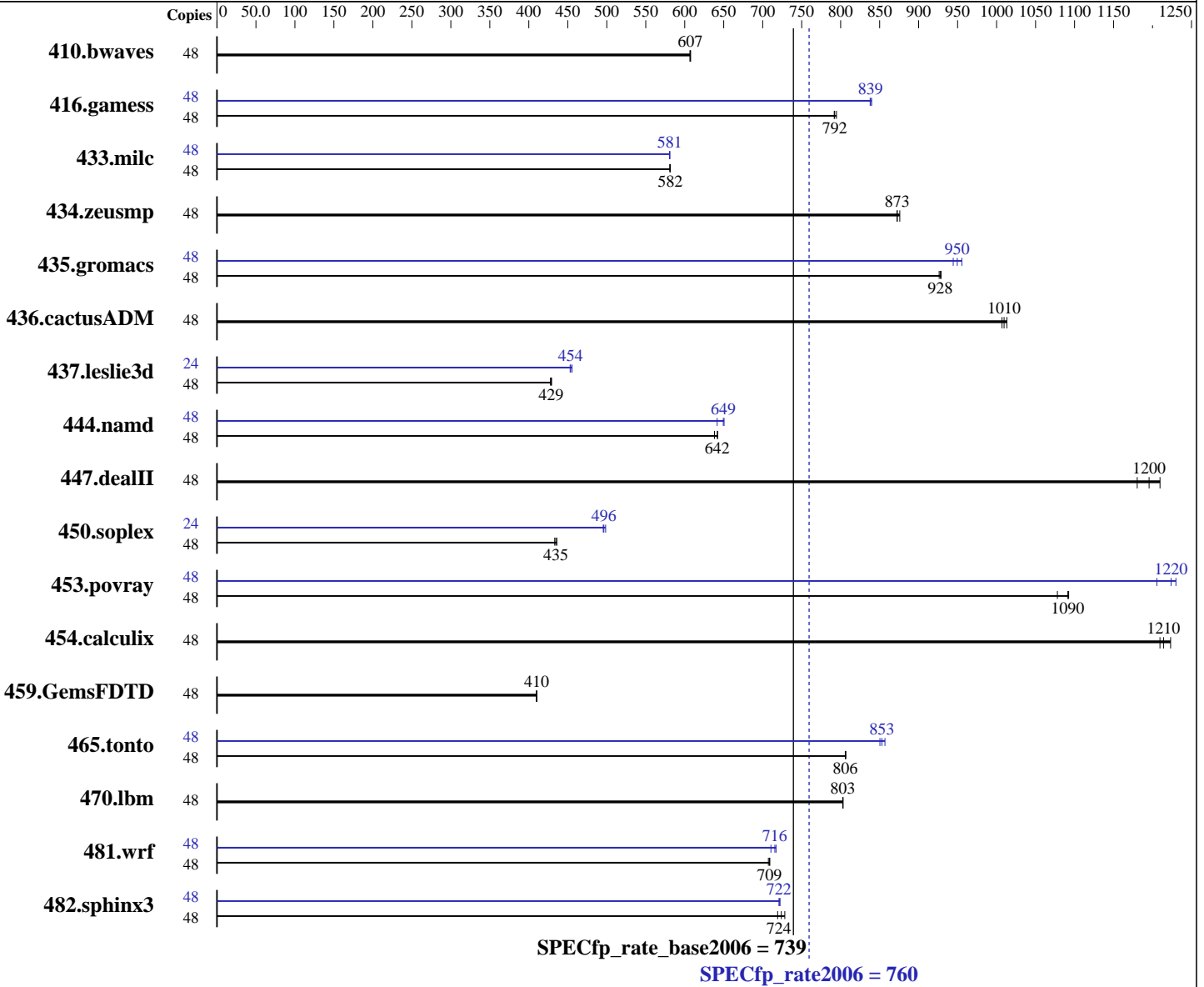
Test date: May-2015

Test sponsor: Lenovo Group Limited

Hardware Availability: Oct-2014

Tested by: Lenovo Group Limited

Software Availability: Sep-2014



### Hardware

CPU Name: Intel Xeon E5-2658 v3  
 CPU Characteristics: Intel Turbo Boost Technology up to 2.90 GHz  
 CPU MHz: 2200  
 FPU: Integrated  
 CPU(s) enabled: 24 cores, 2 chips, 12 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)  
 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: 30 MB I+D on chip per chip  
Other Cache: None  
Memory: 256 GB (16 x 16 GB 2Rx4 PC4-2133P-R)  
Disk Subsystem: 1 x 300 GB SAS, 10000 RPM  
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	48	<b>1074</b>	<b>607</b>	1075	607	1074	607	48	<b>1074</b>	<b>607</b>	1075	607	1074	607
416.gamess	48	<b>1186</b>	<b>792</b>	1183	795	1187	792	48	1122	838	<b>1121</b>	<b>839</b>	1119	840
433.milc	48	758	582	<b>758</b>	<b>582</b>	759	581	48	759	581	<b>759</b>	<b>581</b>	759	581
434.zeusmp	48	<b>501</b>	<b>873</b>	499	876	501	872	48	<b>501</b>	<b>873</b>	499	876	501	872
435.gromacs	48	369	929	<b>369</b>	<b>928</b>	370	926	48	363	944	359	955	<b>361</b>	<b>950</b>
436.cactusADM	48	570	1010	566	1010	<b>568</b>	<b>1010</b>	48	570	1010	566	1010	<b>568</b>	<b>1010</b>
437.leslie3d	48	1055	428	1051	429	<b>1053</b>	<b>429</b>	24	<b>497</b>	<b>454</b>	495	455	498	453
444.namd	48	599	642	603	638	<b>600</b>	<b>642</b>	48	600	642	592	650	<b>593</b>	<b>649</b>
447.dealII	48	<b>459</b>	<b>1200</b>	465	1180	454	1210	48	<b>459</b>	<b>1200</b>	465	1180	454	1210
450.soplex	48	918	436	<b>921</b>	<b>435</b>	924	433	24	404	496	402	499	<b>403</b>	<b>496</b>
453.povray	48	234	1090	237	1080	<b>234</b>	<b>1090</b>	48	212	1210	<b>209</b>	<b>1220</b>	208	1230
454.calculix	48	<b>326</b>	<b>1210</b>	324	1220	327	1210	48	<b>326</b>	<b>1210</b>	324	1220	327	1210
459.GemsFDTD	48	<b>1242</b>	<b>410</b>	1243	410	1241	410	48	<b>1242</b>	<b>410</b>	1243	410	1241	410
465.tonto	48	<b>586</b>	<b>806</b>	585	807	586	806	48	555	850	551	857	<b>554</b>	<b>853</b>
470.lbm	48	822	803	821	803	<b>821</b>	<b>803</b>	48	822	803	821	803	<b>821</b>	<b>803</b>
481.wrf	48	758	707	<b>757</b>	<b>709</b>	756	709	48	748	717	755	711	<b>749</b>	<b>716</b>
482.sphinx3	48	1284	728	<b>1292</b>	<b>724</b>	1301	719	48	1298	721	1296	722	<b>1296</b>	<b>722</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

BIOS setting:  
Operating Mode set to "Efficiency-Favor Performance"  
Sysinfo program /home/SPEC/config/sysinfo.rev6914

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### Platform Notes (Continued)

\$Rev: 6914 \$ \$Date:: 2014-06-25 #\$ e3fbb8667b5a285932ceab81e28219e1  
running on x3550m5.labs.lenovo.com Tue May 5 12:41:18 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>

```
From /proc/cpuinfo
model name : Intel(R) Xeon(R) CPU E5-2658 v3 @ 2.20GHz
 2 "physical id"s (chips)
 48 "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 : 6
  siblings  : 12
  physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 13
  physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 13
cache size : 15360 KB
```

```
From /proc/meminfo
MemTotal:      263446676 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.labs.lenovo.com 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
Filesystem      Type      Size      Used Avail Use% Mounted on
/dev/mapper/rhel-root xfs      275G      69G  206G  26% /
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

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## Platform Notes (Continued)

hardware, firmware, and the "DMTF SMBIOS" standard.

BIOS IBM -[TBE105KUS-1.10]- 04/17/2015

Memory:

14x Hynix HMA42GR7MFR4N-TF 16 GB 2 rank 2133 MHz

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

8x NO DIMM Unknown

(End of data from sysinfo program)

## General Notes

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

LD\_LIBRARY\_PATH = "/home/SPEC/libs/32:/home/SPEC/libs/64:/home/SPEC/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

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## Base Portability Flags (Continued)

```

437.leslie3d: -DSPEC_CPU_LP64
444.namd: -DSPEC_CPU_LP64
447.deall: -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
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 -opt-mem-layout-trans=3

```

C++ benchmarks:

```

-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32
-ansi-alias -opt-mem-layout-trans=3

```

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 -opt-mem-layout-trans=3

```

## 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)
         -opt-mem-layout-trans=3(pass 2) -prof-use(pass 2)
         -auto-ilp32

470.lbm: basepeak = yes

482.sphinx3: -xCORE-AVX2 -ipo -O3 -no-prec-div -opt-mem-layout-trans=3
            -unroll2

```

C++ benchmarks:

```

444.namd: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)
         -O3(pass 2) -no-prec-div(pass 2)
         -opt-mem-layout-trans=3(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)
         -opt-mem-layout-trans=3(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)
         -opt-mem-layout-trans=3(pass 2) -prof-use(pass 2) -unroll4
         -ansi-alias

```

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## Peak Optimization Flags (Continued)

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: -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)  
-opt-mem-layout-trans=3(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.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.xml>



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

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