



# SPEC<sup>®</sup> CFP2006 Result

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## Lenovo Group Limited

### SPECfp<sup>®</sup>\_rate2006 = 805

Lenovo Flex System x240 M5  
(Intel Xeon E5-2695 v3, 2.30 GHz)

### SPECfp\_rate\_base2006 = 782

CPU2006 license: 9017

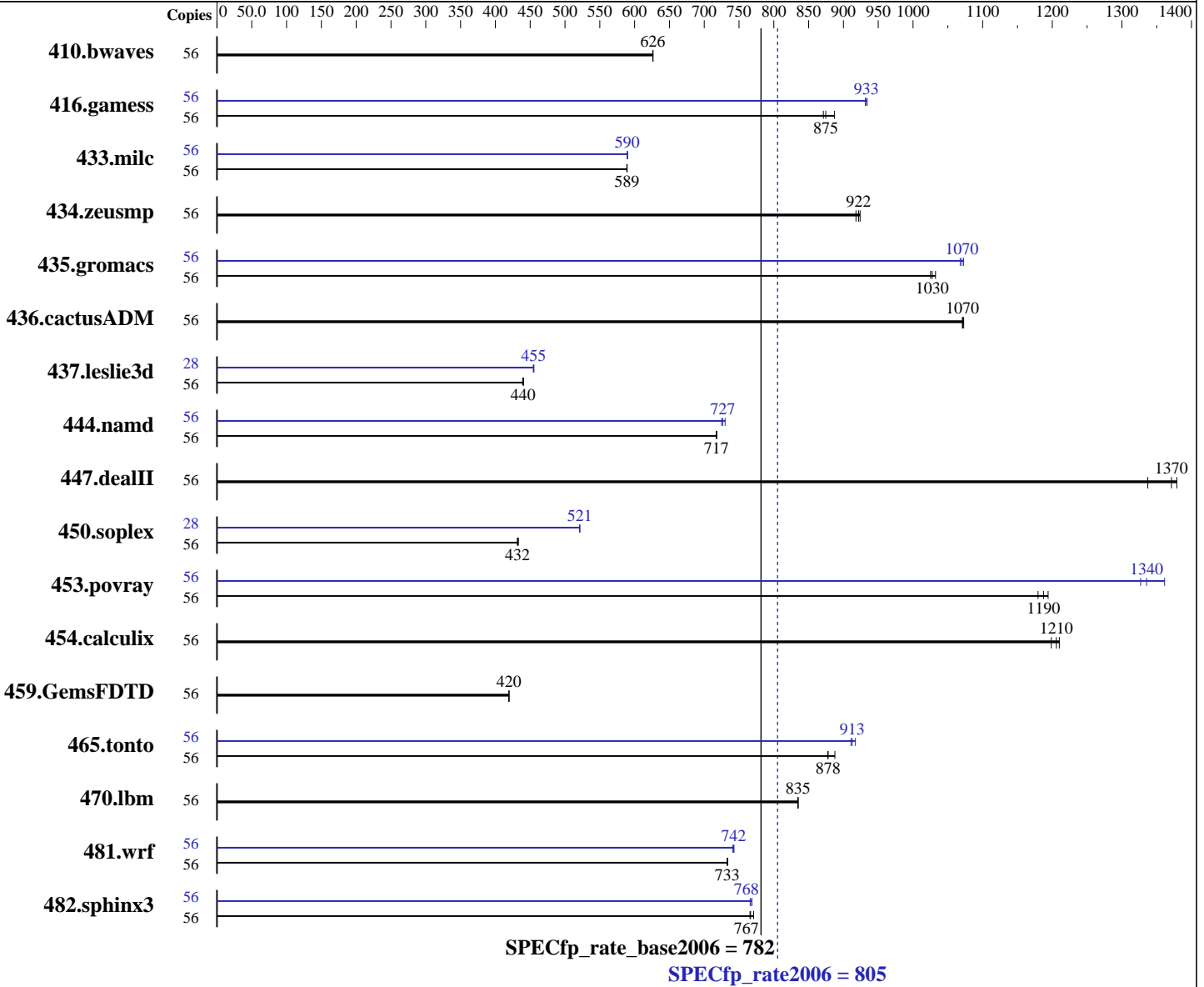
Test date: Aug-2015

Test sponsor: Lenovo Group Limited

Hardware Availability: Dec-2014

Tested by: Lenovo Group Limited

Software Availability: Nov-2013



### Hardware

CPU Name: Intel Xeon E5-2695 v3  
 CPU Characteristics: Intel Turbo Boost Technology up to 3.30 GHz  
 CPU MHz: 2300  
 FPU: Integrated  
 CPU(s) enabled: 28 cores, 2 chips, 14 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 6.5 (Santiago)  
 2.6.32-431.el6.x86\_64  
 Compiler: C/C++: Version 14.0.0.080 of Intel C++ Studio XE for Linux;  
 Fortran: Version 14.0.0.080 of Intel Fortran Studio XE for Linux  
 Auto Parallel: No  
 File System: ext4

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SPECfp\_rate2006 = **805**

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SPECfp\_rate\_base2006 = **782**

CPU2006 license: 9017

Test date: Aug-2015

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L3 Cache: 35 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	56	1215	626	1215	626	<b>1215</b>	<b>626</b>	56	1215	626	1215	626	<b>1215</b>	<b>626</b>
416.gamess	56	1259	871	1236	887	<b>1254</b>	<b>875</b>	56	<b>1175</b>	<b>933</b>	1174	934	1177	931
433.milc	56	873	589	<b>873</b>	<b>589</b>	872	589	56	871	590	<b>872</b>	<b>590</b>	872	589
434.zeusmp	56	555	918	552	924	<b>553</b>	<b>922</b>	56	555	918	552	924	<b>553</b>	<b>922</b>
435.gromacs	56	390	1030	<b>389</b>	<b>1030</b>	387	1030	56	373	1070	374	1070	<b>374</b>	<b>1070</b>
436.cactusADM	56	624	1070	625	1070	<b>625</b>	<b>1070</b>	56	624	1070	625	1070	<b>625</b>	<b>1070</b>
437.leslie3d	56	1199	439	1195	441	<b>1196</b>	<b>440</b>	28	579	454	578	455	<b>579</b>	<b>455</b>
444.namd	56	<b>626</b>	<b>717</b>	625	718	626	717	56	620	725	<b>618</b>	<b>727</b>	615	730
447.dealII	56	479	1340	<b>467</b>	<b>1370</b>	465	1380	56	479	1340	<b>467</b>	<b>1370</b>	465	1380
450.soplex	56	1078	433	1082	432	<b>1081</b>	<b>432</b>	28	448	521	<b>448</b>	<b>521</b>	448	521
453.povray	56	253	1180	<b>251</b>	<b>1190</b>	250	1190	56	225	1330	219	1360	<b>223</b>	<b>1340</b>
454.calculix	56	<b>383</b>	<b>1210</b>	382	1210	385	1200	56	<b>383</b>	<b>1210</b>	382	1210	385	1200
459.GemsFDTD	56	1416	420	1416	419	<b>1416</b>	<b>420</b>	56	1416	420	1416	419	<b>1416</b>	<b>420</b>
465.tonto	56	621	888	628	877	<b>628</b>	<b>878</b>	56	601	917	<b>604</b>	<b>913</b>	605	911
470.lbm	56	921	835	922	834	<b>922</b>	<b>835</b>	56	921	835	922	834	<b>922</b>	<b>835</b>
481.wrf	56	853	734	<b>853</b>	<b>733</b>	853	733	56	<b>843</b>	<b>742</b>	842	743	844	741
482.sphinx3	56	1425	766	1416	771	<b>1424</b>	<b>767</b>	56	1420	768	1425	766	<b>1421</b>	<b>768</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

Operating Mode set to Maximum Performance in BIOS  
Enabled COD Preference in BIOS  
Disable Early Snoop Preference in BIOS

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**SPECfp\_rate\_base2006 = 782**

**CPU2006 license:** 9017

**Test date:** Aug-2015

**Test sponsor:** Lenovo Group Limited

**Hardware Availability:** Dec-2014

**Tested by:** Lenovo Group Limited

**Software Availability:** Nov-2013

### Platform Notes (Continued)

Sysinfo program /cpu2006.1.2\_14.0\_jan2014/config/sysinfo.rev6818  
\$Rev: 6818 \$ \$Date:: 2012-07-17 #\$ e86d102572650a6e4d596a3cee98f191  
running on newport-rhel6.5 Wed Aug 12 23:29:39 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 E5-2695 v3 @ 2.30GHz
    2 "physical id"s (chips)
    56 "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 : 14
    siblings  : 28
    physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
    physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
  cache size : 17920 KB
```

```
From /proc/meminfo
MemTotal:      264118268 kB
HugePages_Total:    0
Hugepagesize:    2048 kB
```

```
/usr/bin/lsb_release -d
Red Hat Enterprise Linux Server release 6.5 (Santiago)
```

```
From /etc/*release* /etc/*version*
redhat-release: Red Hat Enterprise Linux Server release 6.5 (Santiago)
system-release: Red Hat Enterprise Linux Server release 6.5 (Santiago)
system-release-cpe: cpe:/o:redhat:enterprise_linux:6server:ga:server
```

```
uname -a:
Linux newport-rhel6.5 2.6.32-431.el6.x86_64 #1 SMP Sun Nov 10 22:19:54 EST
2013 x86_64 x86_64 x86_64 GNU/Linux
```

```
run-level 3 Aug 12 11:00 last=5
```

```
SPEC is set to: /cpu2006.1.2_14.0_jan2014
Filesystem                Type      Size   Used Avail Use% Mounted on
/dev/mapper/vg_newportrhel6-lv_root ext4      265G   86G  166G  35% /
```

```
Additional information from dmidecode:
BIOS IBM  -[C4E105JUS-1.10]- 04/11/2015
Memory:
  8x NO DIMM Unknown
  16x Samsung M393A2G40DB0-CPB 16 GB 2133 MHz 2 rank
```

(End of data from sysinfo program)



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## General Notes

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

```
LD_LIBRARY_PATH = "/cpu2006.1.2_14.0_jan2014/libs/32:/cpu2006.1.2_14.0_jan2014/libs/64:/cpu2006.1.2_14.0_jan2014/sh"
```

Binaries compiled on a system with 1x Core i7-860 CPU + 8GB memory using RedHat EL 6.4

Transparent Huge Pages enabled with:

```
echo always > /sys/kernel/mm/redhat_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.deallI: -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

```



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## 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 (except as noted below):

icc -m64

482.sphinx3: icc -m32

C++ benchmarks (except as noted below):

icpc -m64

450.soplex: icpc -m32

Fortran benchmarks:

ifort -m64

Benchmarks using both Fortran and C:

icc -m64 ifort -m64

## 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.deallI: -DSPEC\_CPU\_LP64

453.povray: -DSPEC\_CPU\_LP64

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Hardware Availability: Dec-2014

Tested by: Lenovo Group Limited

Software Availability: Nov-2013

## Peak 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

```

## 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

```

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-

```

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## Peak Optimization Flags (Continued)

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-alloc -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-ic14.0-official-linux64.20140128.html>  
<http://www.spec.org/cpu2006/flags/Lenovo-Platform-Flags-V1.2-HSW-BB.html>

You can also download the XML flags sources by saving the following links:

<http://www.spec.org/cpu2006/flags/Intel-ic14.0-official-linux64.20140128.xml>  
<http://www.spec.org/cpu2006/flags/Lenovo-Platform-Flags-V1.2-HSW-BB.xml>

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Tested with SPEC CPU2006 v1.2.  
Report generated on Tue Sep 8 22:40:45 2015 by SPEC CPU2006 PS/PDF formatter v6932.  
Originally published on 8 September 2015.