



# SPEC<sup>®</sup> CFP2006 Result

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## Lenovo Group Limited

Lenovo ThinkServer RS160  
(2.10 GHz, Intel Xeon E3-1240L v5)

SPECfp<sup>®</sup>\_rate2006 = 169

SPECfp\_rate\_base2006 = 165

CPU2006 license: 9017

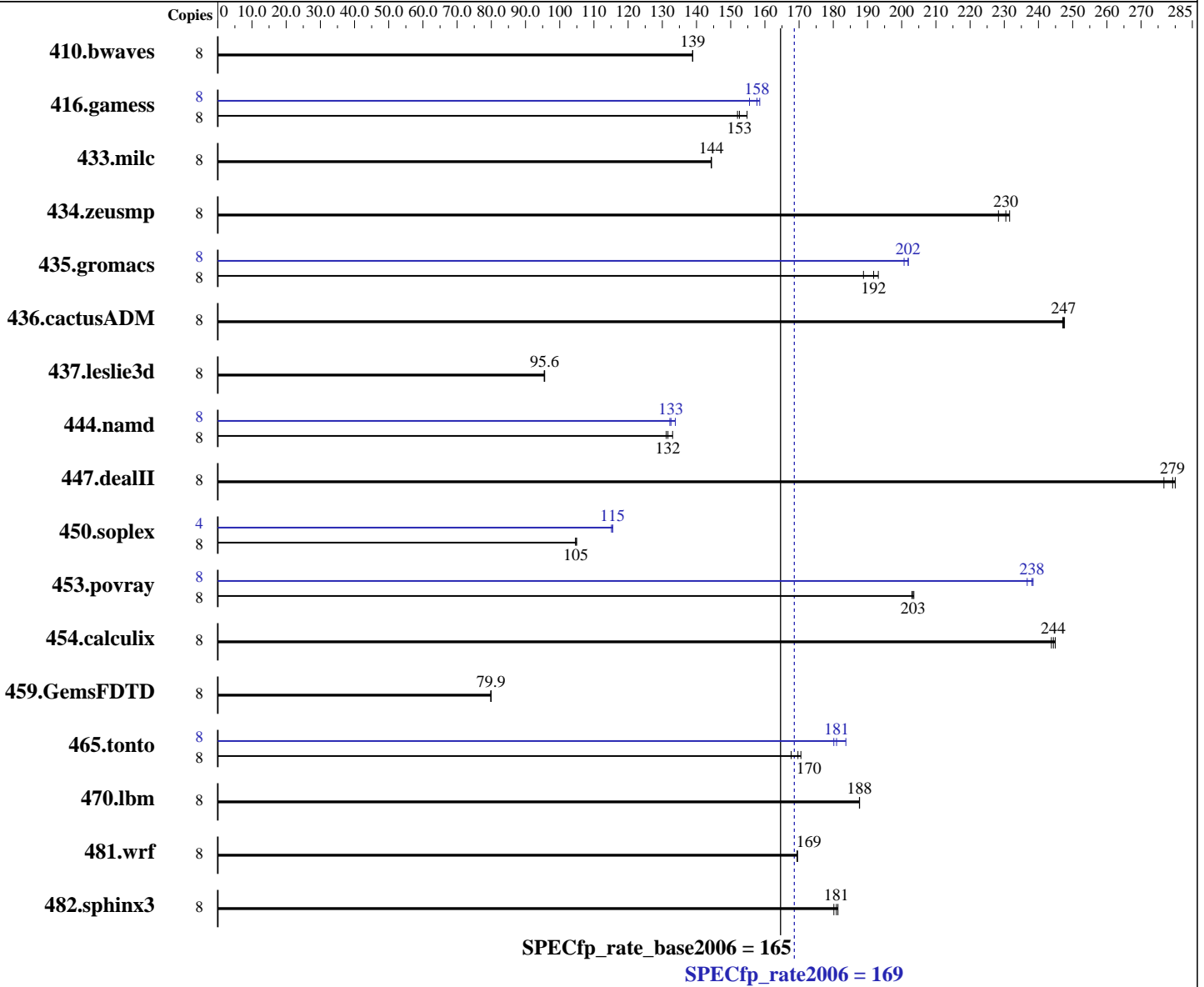
Test sponsor: Lenovo Group Limited

Tested by: Lenovo Group Limited

Test date: Nov-2016

Hardware Availability: Sep-2016

Software Availability: Mar-2016



### Hardware

CPU Name: Intel Xeon E3-1240L v5  
 CPU Characteristics: Intel Turbo Boost Technology up to 3.20 GHz  
 CPU MHz: 2100  
 FPU: Integrated  
 CPU(s) enabled: 4 cores, 1 chip, 4 cores/chip, 2 threads/core  
 CPU(s) orderable: 1 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 7.2  
 Kernel 3.10.0-327.el7.x86\_64  
 Compiler: C/C++: Version 16.0.2.181 of Intel C++ Studio XE for Linux;  
 Fortran: Version 16.0.2.181 of Intel Fortran Studio XE for Linux  
 Auto Parallel: No  
 File System: xfs  
 System State: Run level 3 (multi-user)

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L3 Cache: 8 MB I+D on chip per chip  
Other Cache: None  
Memory: 16 GB (2 x 8 GB 2Rx8 PC4-2133P-E)  
Disk Subsystem: 1 x 800 GB SATA SSD  
Other Hardware: None

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	8	<b>783</b>	<b>139</b>	783	139	783	139	8	<b>783</b>	<b>139</b>	783	139	783	139
416.gamess	8	1012	155	1031	152	<b>1027</b>	<b>153</b>	8	988	158	<b>993</b>	<b>158</b>	1007	155
433.milc	8	509	144	509	144	<b>509</b>	<b>144</b>	8	509	144	509	144	<b>509</b>	<b>144</b>
434.zeusmp	8	319	228	314	232	<b>316</b>	<b>230</b>	8	319	228	314	232	<b>316</b>	<b>230</b>
435.gromacs	8	302	189	296	193	<b>298</b>	<b>192</b>	8	283	202	<b>283</b>	<b>202</b>	285	201
436.cactusADM	8	386	248	387	247	<b>387</b>	<b>247</b>	8	386	248	387	247	<b>387</b>	<b>247</b>
437.leslie3d	8	<b>787</b>	<b>95.6</b>	788	95.4	787	95.6	8	<b>787</b>	<b>95.6</b>	788	95.4	787	95.6
444.namd	8	<b>487</b>	<b>132</b>	482	133	489	131	8	<b>484</b>	<b>133</b>	479	134	485	132
447.dealII	8	331	277	<b>328</b>	<b>279</b>	327	280	8	331	277	<b>328</b>	<b>279</b>	327	280
450.soplex	8	<b>637</b>	<b>105</b>	638	105	636	105	4	290	115	289	115	<b>289</b>	<b>115</b>
453.povray	8	210	203	<b>209</b>	<b>203</b>	209	204	8	178	238	<b>179</b>	<b>238</b>	180	237
454.calculix	8	269	245	271	244	<b>270</b>	<b>244</b>	8	269	245	271	244	<b>270</b>	<b>244</b>
459.GemsFDTD	8	1063	79.8	<b>1062</b>	<b>79.9</b>	1062	80.0	8	1063	79.8	<b>1062</b>	<b>79.9</b>	1062	80.0
465.tonto	8	469	168	462	171	<b>464</b>	<b>170</b>	8	429	184	<b>435</b>	<b>181</b>	437	180
470.lbm	8	586	188	586	188	<b>586</b>	<b>188</b>	8	586	188	586	188	<b>586</b>	<b>188</b>
481.wrf	8	527	169	<b>527</b>	<b>169</b>	527	170	8	527	169	<b>527</b>	<b>169</b>	527	170
482.sphinx3	8	865	180	860	181	<b>862</b>	<b>181</b>	8	865	180	860	181	<b>862</b>	<b>181</b>

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

## Submit Notes

The taskset mechanism was used to bind copies to processors. The config file option 'submit' was used to generate taskset 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"  
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



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### Platform Notes

BIOS configuration:

Boot performance mode set to Turbo Performance

Sysinfo program /home/cpu2006-1.2-ic16.0/config/sysinfo.rev6914

\$Rev: 6914 \$ \$Date:: 2014-06-25 #\$ e3fbb8667b5a285932ceab81e28219e1

running on RS160 Fri Dec 9 04:25:58 2016

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 E3-1240L v5 @ 2.10GHz

1 "physical id"s (chips)

8 "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 : 4

siblings : 8

physical 0: cores 0 1 2 3

cache size : 8192 KB

From /proc/meminfo

MemTotal: 16375376 kB

HugePages\_Total: 0

Hugepagesize: 2048 kB

From /etc/\*release\* /etc/\*version\*

os-release:

NAME="Red Hat Enterprise Linux Server"

VERSION="7.2 (Maipo)"

ID="rhel"

ID\_LIKE="fedora"

VERSION\_ID="7.2"

PRETTY\_NAME="Red Hat Enterprise Linux Server 7.2 (Maipo)"

ANSI\_COLOR="0;31"

CPE\_NAME="cpe:/o:redhat:enterprise\_linux:7.2:GA:server"

redhat-release: Red Hat Enterprise Linux Server release 7.2 (Maipo)

system-release: Red Hat Enterprise Linux Server release 7.2 (Maipo)

system-release-cpe: cpe:/o:redhat:enterprise\_linux:7.2:ga:server

uname -a:

Linux RS160 3.10.0-327.el7.x86\_64 #1 SMP Thu Oct 29 17:29:29 EDT 2015 x86\_64

x86\_64 x86\_64 GNU/Linux

run-level 3 Dec 8 18:43

SPEC is set to: /home/cpu2006-1.2-ic16.0

Filesystem Type Size Used Avail Use% Mounted on

/dev/sda5 xfs 687G 4.0G 683G 1% /home

Additional information from dmidecode:

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info@spec.org

<http://www.spec.org/>



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## Platform Notes (Continued)

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 LENOVO VB1TS152 09/29/2016

Memory:

2x Not Specified Not Specified

2x Samsung M391A1G43EB1-CPB 8 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 = "/home/cpu2006-1.2-ic16.0/libs/32:/home/cpu2006-1.2-ic16.0/libs/64:/home/cpu2006-1.2-ic16.0/sh"

Binaries compiled on a system with 1x Intel Core i7-4790K CPU + 32GB memory using RedHat EL 7.2 glibc 2.17

## 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

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## Base Portability Flags (Continued)

```

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/compilers_and_libraries_2016/linux/compiler/lib/ia32_lin

```

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
450.soplex: -D_FILE_OFFSET_BITS=64
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: 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) -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:threadsafe(pass 1)
           -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)
           -par-num-threads=1(pass 1) -opt-mem-layout-trans=3(pass 2)
           -prof-use(pass 2) -opt-malloc-options=3

```

```

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) -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: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: basepeak = yes

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

Benchmarks using both Fortran and C:

435.gromacs: -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) -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: 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-Settings-V1.2-BDW-revC.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-Settings-V1.2-BDW-revC.xml>



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

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