



# SPEC<sup>®</sup> CFP2006 Result

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## Lenovo Group Limited

SPECfp<sup>®</sup>2006 = **96.2**

Lenovo ThinkServer RD452X  
(Intel Xeon E5-2680 v3, 2.50 GHz)

SPECfp\_base2006 = **93.1**

CPU2006 license: 9017

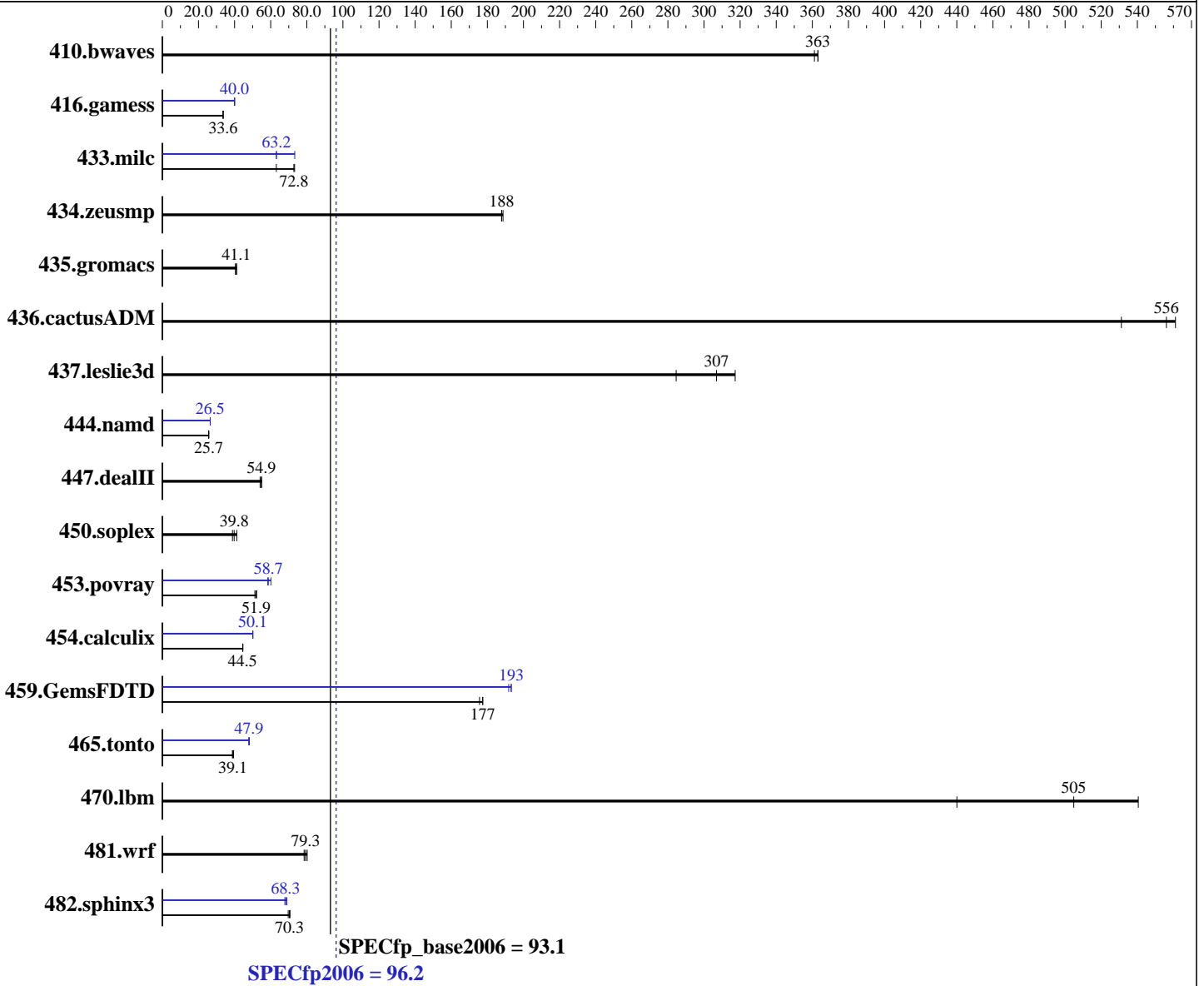
Test date: Sep-2016

Test sponsor: Lenovo Group Limited

Hardware Availability: Nov-2015

Tested by: Lenovo Group Limited

Software Availability: Sep-2013



Hardware	
CPU Name:	Intel Xeon E5-2680 v3
CPU Characteristics:	Intel Turbo Boost Technology up to 3.30 GHz
CPU MHz:	2500
FPU:	Integrated
CPU(s) enabled:	24 cores, 2 chips, 12 cores/chip
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 6.7 (Santiago)
	2.6.32-573.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:	Yes
File System:	ext4

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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, running at 1866 MHz)  
Disk Subsystem: 1 x 480 GB SATA SSD  
Other Hardware: None

System State: Run level 5 (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	<b>37.4</b>	<b>363</b>	37.4	363	37.6	361	<b>37.4</b>	<b>363</b>	37.4	363	37.6	361
416.gamess	<b>582</b>	<b>33.6</b>	582	33.7	582	33.6	490	39.9	<b>489</b>	<b>40.0</b>	489	40.0
433.milc	<b>126</b>	<b>72.8</b>	145	63.1	125	73.2	125	73.3	<b>145</b>	<b>63.2</b>	145	63.2
434.zeusmp	48.4	188	48.2	189	<b>48.4</b>	<b>188</b>	48.4	188	48.2	189	<b>48.4</b>	<b>188</b>
435.gromacs	174	41.1	177	40.4	<b>174</b>	<b>41.1</b>	174	41.1	177	40.4	<b>174</b>	<b>41.1</b>
436.cactusADM	21.3	561	22.5	531	<b>21.5</b>	<b>556</b>	21.3	561	22.5	531	<b>21.5</b>	<b>556</b>
437.leslie3d	29.6	317	<b>30.6</b>	<b>307</b>	33.0	285	29.6	317	<b>30.6</b>	<b>307</b>	33.0	285
444.namd	<b>312</b>	<b>25.7</b>	312	25.7	312	25.7	302	26.5	303	26.5	<b>302</b>	<b>26.5</b>
447.dealII	211	54.1	<b>208</b>	<b>54.9</b>	208	55.0	211	54.1	<b>208</b>	<b>54.9</b>	208	55.0
450.soplex	202	41.2	215	38.8	<b>210</b>	<b>39.8</b>	202	41.2	215	38.8	<b>210</b>	<b>39.8</b>
453.povray	102	52.2	104	51.2	<b>102</b>	<b>51.9</b>	91.1	58.4	88.5	60.1	<b>90.7</b>	<b>58.7</b>
454.calculix	<b>185</b>	<b>44.5</b>	185	44.5	185	44.6	164	50.2	<b>165</b>	<b>50.1</b>	165	50.0
459.GemsFDTD	59.8	177	<b>59.8</b>	<b>177</b>	60.4	176	55.3	192	<b>54.9</b>	<b>193</b>	54.9	193
465.tonto	<b>252</b>	<b>39.1</b>	250	39.4	254	38.8	204	48.2	<b>205</b>	<b>47.9</b>	206	47.9
470.lbm	31.2	440	<b>27.2</b>	<b>505</b>	25.4	541	31.2	440	<b>27.2</b>	<b>505</b>	25.4	541
481.wrf	142	78.5	139	80.2	<b>141</b>	<b>79.3</b>	142	78.5	139	80.2	<b>141</b>	<b>79.3</b>
482.sphinx3	280	69.7	<b>277</b>	<b>70.3</b>	276	70.7	<b>285</b>	<b>68.3</b>	283	69.0	287	67.8

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 Configuration:

Hyper-Threading set to Disabled  
Cluster on Die set to Disabled  
Early Snoop set to Enabled  
Sysinfo program /cpu2006/config/sysinfo.rev6818  
\$Rev: 6818 \$ \$Date:: 2012-07-17 #\$ e86d102572650a6e4d596a3cee98f191  
running on localhost.localdomain Sun Sep 18 15:21:32 2016

This section contains SUT (System Under Test) info as seen by

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### Platform Notes (Continued)

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 E5-2680 v3 @ 2.50GHz
    2 "physical id"s (chips)
    24 "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 : 12
    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 : 30720 KB

```

```

From /proc/meminfo
MemTotal:      264504428 kB
HugePages_Total:      0
Hugepagesize:    2048 kB

```

```

/usr/bin/lsb_release -d
  Red Hat Enterprise Linux Server release 6.7 (Santiago)

```

```

From /etc/*release* /etc/*version*
redhat-release: Red Hat Enterprise Linux Server release 6.7 (Santiago)
system-release: Red Hat Enterprise Linux Server release 6.7 (Santiago)
system-release-cpe: cpe:/o:redhat:enterprise_linux:6server:ga:server

```

```

uname -a:
Linux localhost.localdomain 2.6.32-573.el6.x86_64 #1 SMP Wed Jul 1 18:23:37
EDT 2015 x86_64 x86_64 x86_64 GNU/Linux

```

run-level 5 Sep 18 09:49

```

SPEC is set to: /cpu2006
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sda2       ext4  193G  102G   82G  56% /

```

```

Additional information from dmidecode:
BIOS American Megatrends Inc. A1.11 04/09/2016
Memory:
 16x   16 GB
 16x Samsung M393A2G40DB0-CPB 16 GB 1866 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:  
KMP\_AFFINITY = "granularity=fine,compact,1,0"  
LD\_LIBRARY\_PATH = "/cpu2006/libs/32:/cpu2006/libs/64:/cpu2006/sh"  
OMP\_NUM\_THREADS = "24"

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  
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 -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: -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 -ansi-alias

470.lbm: basepeak = yes

482.sphinx3: -xCORE-AVX2 -ipo -O3 -no-prec-div -unroll2 -ansi-alias  
-parallel

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## Peak Optimization Flags (Continued)

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.dealIII: basepeak = yes

450.soplex: basepeak = yes

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:

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: basepeak = yes

459.GemsFDTD: -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 -opt-prefetch -parallel

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

Benchmarks using both Fortran and C:

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-ic14.0-official-linux64.20140128.html>

<http://www.spec.org/cpu2006/flags/Lenovo-Platform-Settings-V1.2-BDW-revC.html>



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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-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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