



SPEC[®] CFP2006 Result

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Lenovo Group Limited

Lenovo ThinkServer RD550 (Intel Xeon E5-2650L v3, 1.80 GHz)

SPECfp[®]2006 = 89.1

SPECfp_base2006 = 85.7

CPU2006 license: 9017

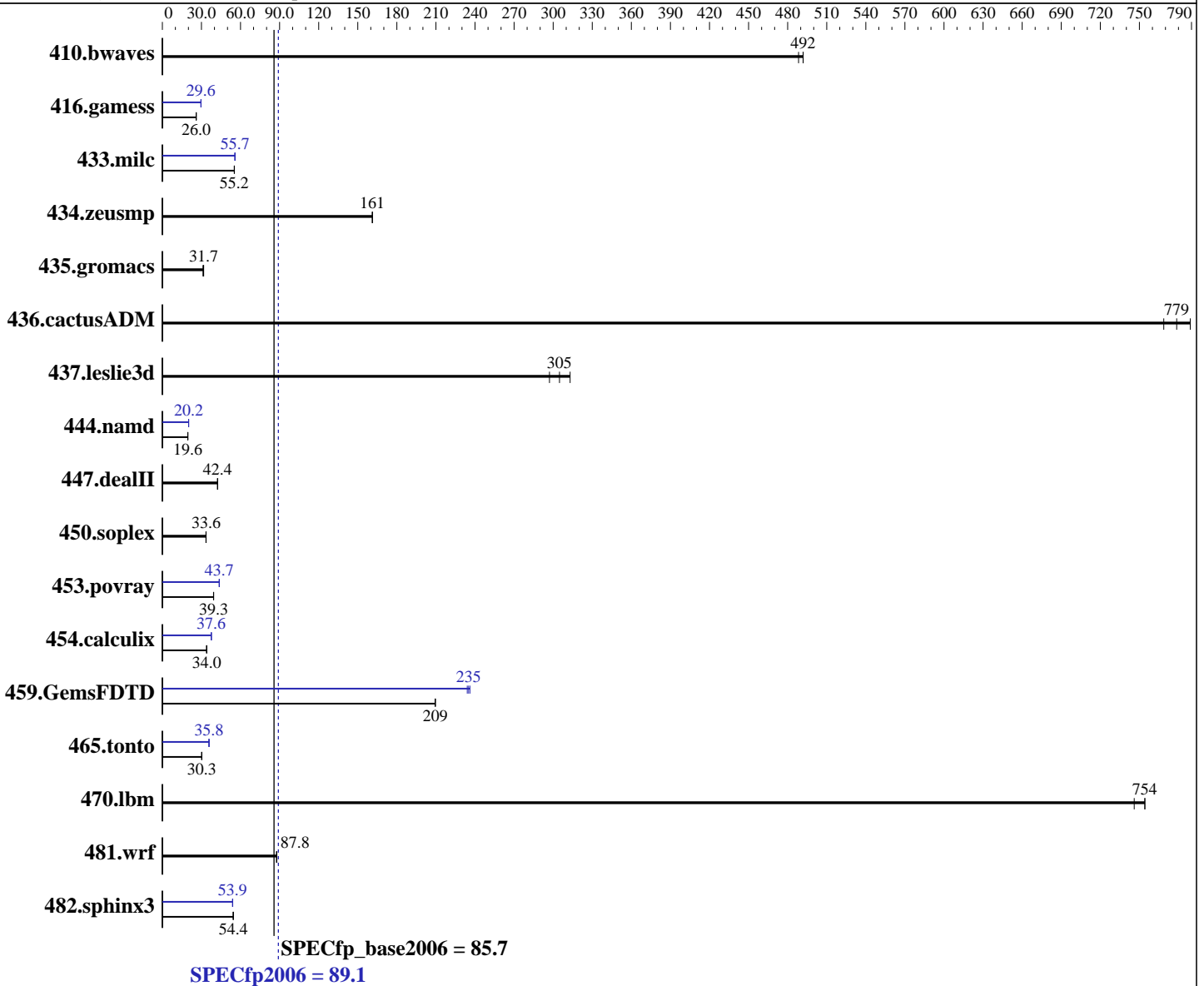
Test sponsor: Lenovo Group Limited

Tested by: Lenovo Group Limited

Test date: Nov-2014

Hardware Availability: Sep-2014

Software Availability: Jan-2014



Hardware

CPU Name: Intel Xeon E5-2650L v3
 CPU Characteristics: Intel Turbo Boost Technology up to 2.50 GHz
 CPU MHz: 1800
 FPU: Integrated
 CPU(s) enabled: 24 cores, 2 chips, 12 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 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: 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)
Disk Subsystem: 1 x 800 GB SATA SSD
Other Hardware: None

System State: Run level 3 (multit-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	<u>27.6</u>	<u>492</u>	27.6	492	27.8	488	<u>27.6</u>	<u>492</u>	27.6	492	27.8	488
416.gamess	754	26.0	753	26.0	<u>754</u>	<u>26.0</u>	659	29.7	<u>661</u>	<u>29.6</u>	661	29.6
433.milc	166	55.2	166	55.3	<u>166</u>	<u>55.2</u>	165	55.8	165	55.7	<u>165</u>	<u>55.7</u>
434.zeusmp	56.4	161	56.4	161	<u>56.4</u>	<u>161</u>	56.4	161	56.4	161	<u>56.4</u>	<u>161</u>
435.gromacs	229	31.2	225	31.7	<u>226</u>	<u>31.7</u>	229	31.2	225	31.7	<u>226</u>	<u>31.7</u>
436.cactusADM	<u>15.3</u>	<u>779</u>	15.1	789	15.5	769	<u>15.3</u>	<u>779</u>	15.1	789	15.5	769
437.leslie3d	<u>30.8</u>	<u>305</u>	31.6	297	30.0	313	<u>30.8</u>	<u>305</u>	31.6	297	30.0	313
444.namd	410	19.6	<u>410</u>	<u>19.6</u>	410	19.5	397	20.2	398	20.2	<u>397</u>	<u>20.2</u>
447.dealII	270	42.4	<u>270</u>	<u>42.4</u>	270	42.4	270	42.4	<u>270</u>	<u>42.4</u>	270	42.4
450.soplex	<u>248</u>	<u>33.6</u>	249	33.4	248	33.6	<u>248</u>	<u>33.6</u>	249	33.4	248	33.6
453.povray	<u>135</u>	<u>39.3</u>	135	39.3	135	39.4	122	43.7	<u>122</u>	<u>43.7</u>	122	43.6
454.calculix	242	34.1	<u>242</u>	<u>34.0</u>	243	33.9	220	37.6	<u>220</u>	<u>37.6</u>	219	37.6
459.GemsFDTD	<u>50.6</u>	<u>209</u>	50.6	209	50.6	210	<u>45.1</u>	<u>235</u>	45.3	234	44.9	236
465.tonto	327	30.1	<u>325</u>	<u>30.3</u>	324	30.3	275	35.8	<u>275</u>	<u>35.8</u>	274	35.9
470.lbm	18.2	754	18.4	746	<u>18.2</u>	<u>754</u>	18.2	754	18.4	746	<u>18.2</u>	<u>754</u>
481.wrf	<u>127</u>	<u>87.8</u>	127	87.6	127	87.9	<u>127</u>	<u>87.8</u>	127	87.6	127	87.9
482.sphinx3	358	54.5	359	54.4	<u>358</u>	<u>54.4</u>	361	54.0	<u>361</u>	<u>53.9</u>	362	53.9

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:
Cluster On Die set to Disabled
Early Snoop set to Disabled
Performance Profile set to Custom
ClE Support set to Disabled
Core C3 set to Disabled
Core C6 set to Disabled
Thermal Profile set to High Fan Speed
Memory Power Savings set to Disabled
Sysinfo program /usr/cpu2006/config/sysinfo.rev6818

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Platform Notes (Continued)

\$Rev: 6818 \$ \$Date:: 2012-07-17 # \$ e86d102572650a6e4d596a3cee98f191
running on RD550 Mon Nov 17 17:57:39 2014

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 E5-2650L v3 @ 1.80GHz
 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 : 12
siblings : 24
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: 264411660 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 RD550 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 Nov 17 17:56
```

```
SPEC is set to: /usr/cpu2006
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sda2       ext4  730G  100G  593G  15% /
```

Additional information from dmidecode:

BIOS LENOVO PB1TS110 10/06/2014

Memory:

16x 16 GB

1x Hynix Semiconductor HMA42GR7MFR4N-TF 16 GB 2133 MHz 2 rank

15x Hynix Semiconductor HMA42GR7MFR4N-TFTD 16 GB 2133 MHz 2 rank

8x NO DIMM NO DIMM

(End of data from sysinfo program)

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Platform Notes (Continued)

RD550 support 4 channels and 12 DIMMs per processor, total 8 channels and 24 DIMMs. 16 DIMM slots installed with 16 GB DIMM for this run.

General Notes

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

KMP_AFFINITY = "granularity=fine,compact,1,0"

LD_LIBRARY_PATH = "/usr/cpu2006/libs/32:/usr/cpu2006/libs/64:/usr/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.dealII: -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

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Base Portability Flags (Continued)

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 -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



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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

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: 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

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Peak Optimization Flags (Continued)

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-RD550-revA.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-Settings-V1.2-RD550-revA.xml>

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Tested with SPEC CPU2006 v1.2.
Report generated on Tue Jan 27 13:31:25 2015 by SPEC CPU2006 PS/PDF formatter v6932.
Originally published on 27 January 2015.