



SPEC[®] CFP2006 Result

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Lenovo Group Limited

Lenovo ThinkServer RD650 (Intel Xeon E5-2698 v3, 2.30 GHz)

SPECfp[®]2006 = **110**

SPECfp_base2006 = **104**

CPU2006 license: 9017

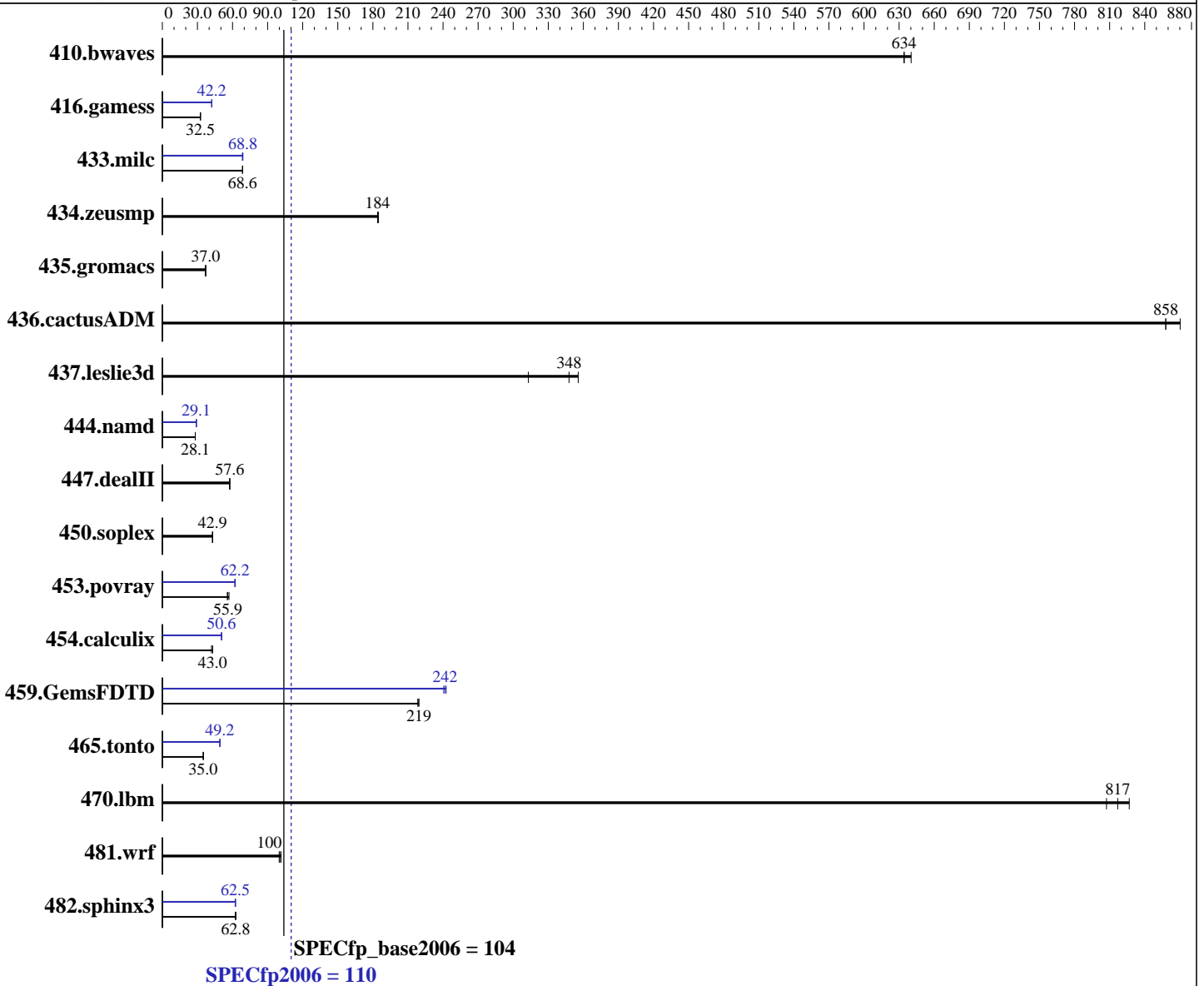
Test sponsor: Lenovo Group Limited

Tested by: Lenovo Group Limited

Test date: Oct-2014

Hardware Availability: Sep-2014

Software Availability: Jan-2014



Hardware

CPU Name: Intel Xeon E5-2698 v3
 CPU Characteristics: Intel Turbo Boost Technology up to 3.60 GHz
 CPU MHz: 2300
 FPU: Integrated
 CPU(s) enabled: 32 cores, 2 chips, 16 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: 40 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 240 GB SATA SSD
Other Hardware: None

System State: Run level 3 (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	<u>21.4</u>	<u>634</u>	21.4	634	21.2	640	<u>21.4</u>	<u>634</u>	21.4	634	21.2	640
416.gamess	603	32.5	600	32.7	<u>602</u>	<u>32.5</u>	462	42.4	<u>464</u>	<u>42.2</u>	465	42.1
433.milc	134	68.6	134	68.5	<u>134</u>	<u>68.6</u>	134	68.4	133	68.9	<u>133</u>	<u>68.8</u>
434.zeusmp	49.4	184	<u>49.4</u>	<u>184</u>	49.2	185	49.4	184	<u>49.4</u>	<u>184</u>	49.2	185
435.gromacs	193	37.1	<u>193</u>	<u>37.0</u>	194	36.9	193	37.1	<u>193</u>	<u>37.0</u>	194	36.9
436.cactusADM	<u>13.9</u>	<u>858</u>	13.9	858	13.7	870	<u>13.9</u>	<u>858</u>	13.9	858	13.7	870
437.leslie3d	30.0	313	26.4	356	<u>27.0</u>	<u>348</u>	30.0	313	26.4	356	<u>27.0</u>	<u>348</u>
444.namd	285	28.1	<u>285</u>	<u>28.1</u>	285	28.1	<u>276</u>	<u>29.1</u>	276	29.1	276	29.1
447.dealII	198	57.7	<u>199</u>	<u>57.6</u>	199	57.6	198	57.7	<u>199</u>	<u>57.6</u>	199	57.6
450.soplex	195	42.8	194	43.0	<u>194</u>	<u>42.9</u>	195	42.8	194	43.0	<u>194</u>	<u>42.9</u>
453.povray	95.8	55.5	93.3	57.0	<u>95.1</u>	<u>55.9</u>	<u>85.5</u>	<u>62.2</u>	85.3	62.3	86.0	61.9
454.calculix	192	43.1	<u>192</u>	<u>43.0</u>	196	42.0	163	50.6	163	50.7	<u>163</u>	<u>50.6</u>
459.GemsFDTD	48.4	219	<u>48.4</u>	<u>219</u>	48.6	218	43.7	243	<u>43.9</u>	<u>242</u>	44.1	241
465.tonto	280	35.1	282	34.9	<u>281</u>	<u>35.0</u>	200	49.2	<u>200</u>	<u>49.2</u>	200	49.1
470.lbm	16.6	827	<u>16.8</u>	<u>817</u>	17.0	807	16.6	827	<u>16.8</u>	<u>817</u>	17.0	807
481.wrf	<u>111</u>	<u>100</u>	110	102	112	99.9	<u>111</u>	<u>100</u>	110	102	112	99.9
482.sphinx3	310	62.8	<u>310</u>	<u>62.8</u>	312	62.5	311	62.6	313	62.2	<u>312</u>	<u>62.5</u>

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 RD650 Tue Oct 28 17:34:27 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 E5-2698 v3 @ 2.30GHz
 2 "physical id"s (chips)
 64 "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 : 16
  siblings  : 32
  physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
  physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
cache size : 40960 KB
```

```
From /proc/meminfo
MemTotal:      264409632 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 RD650 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 Oct 28 17:33
```

```
SPEC is set to: /usr/cpu2006
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sda2       ext4  217G  15G  191G   8% /
```

```
Additional information from dmidecode:
BIOS LENOVO PB2TS110 10/06/2014
Memory:
 16x 16 GB
 8x NO DIMM NO DIMM
 16x Samsung M393A2G40DB0-CPB 16 GB 2133 MHz 2 rank
```

(End of data from sysinfo program)
RD650 support 4 channels and 12 DIMMs per processor, total 8 channels and
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Platform Notes (Continued)

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 = "32"

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
 465.tonto: -DSPEC_CPU_LP64

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Base Portability Flags (Continued)

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

Peak Optimization Flags

C benchmarks:

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Peak Optimization Flags (Continued)

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.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-alloc -opt-malloc-options=3 -auto -unroll4

Benchmarks using both Fortran and C:

435.gromacs: basepeak = yes

436.cactusADM: basepeak = yes

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Peak Optimization Flags (Continued)

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-RD650-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-RD650-revA.xml>

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