SPEC® CFP2006 Result

Lenovo Group Limited

$SPECfp^{®}2006 =$ 63.6

Lenovo ThinkServer RD450 (Intel Xeon E5-2609 v3, 1.90 GHz)

$SPECfp\_base2006 =$ 61.6

CPU2006 license: 9017		**Test date:**	Nov-2014
Test sponsor:	Lenovo Group Limited	**Hardware Availability:**	Dec-2014
Tested by:	Lenovo Group Limited	**Software Availability:**	Sep-2014

0 15.0 30.0 45.0 60.0 75.0 90.0 105 120 135 150 165 180 195 210 225 240 255 270 285 300 315 330 345 360 375 390 410

- 410.bwaves — 266
- 416.gamess — 24.3 / 22.7
- 433.milc — 44.1 / 43.7
- 434.zeusmp — 123
- 435.gromacs — 28.0
- 436.cactusADM — 407
- 437.leslie3d — 156
- 444.namd — 16.5 / 16.0
- 447.dealII — 32.1
- 450.soplex — 24.4
- 453.povray — 36.1 / 32.3
- 454.calculix — 33.9 / 31.9
- 459.GemsFDTD — 153 / 135
- 465.tonto — 30.3 / 25.9
- 470.lbm — 376
- 481.wrf — 56.2
- 482.sphinx3 — 48.0 / 48.4

SPECfp_base2006 = 61.6
SPECfp2006 = 63.6

Hardware

CPU Name:	Intel Xeon E5-2609 v3
CPU Characteristics:	
CPU MHz:	1900
FPU:	Integrated
CPU(s) enabled:	12 cores, 2 chips, 6 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

Continued on next page

Software

Operating System:	Red Hat Enterprise Linux Server release 7.0 (Maipo)
	3.10.0-123.el7.x86_64
Compiler:	C/C++: Version 15.0.0.090 of Intel C++ Studio XE for Linux;
	Fortran: Version 15.0.0.090 of Intel Fortran Studio XE for Linux
Auto Parallel:	Yes
File System:	xfs

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Lenovo Group Limited

Lenovo ThinkServer RD450 (Intel Xeon E5-2609 v3, 1.90 GHz)

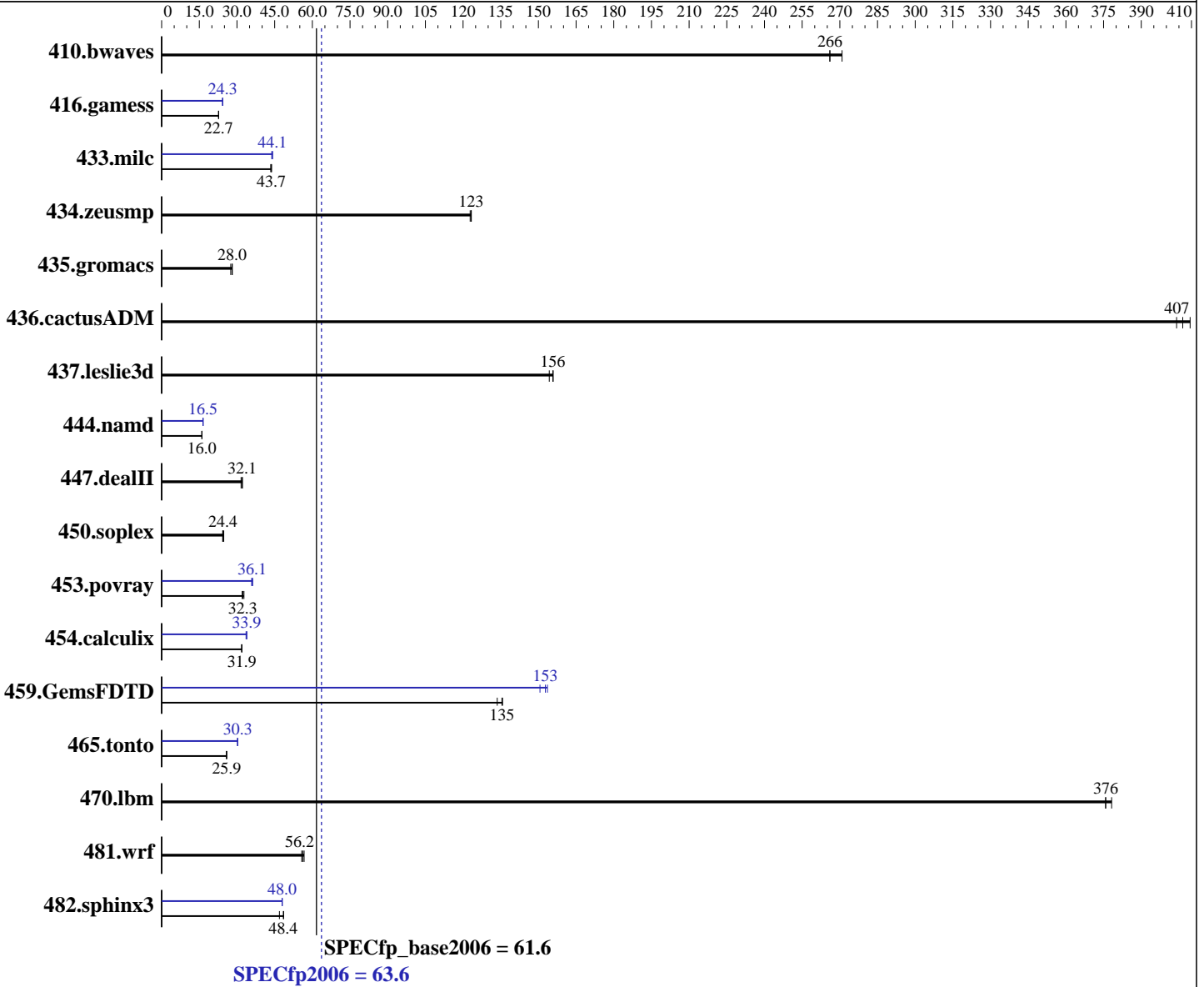| SPECfp2006 =	63.6
SPECfp_base2006 =	61.6

L3 Cache:	15 MB I+D on chip per chip
Other Cache:	None
Memory:	256 GB (16 x 16 GB 2Rx4 PC4-2133P-R, running at 1600 MHz)
Disk Subsystem:	1 x 800 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

	Base						Peak					
Benchmark	**Seconds**	**Ratio**	**Seconds**	**Ratio**	**Seconds**	**Ratio**	**Seconds**	**Ratio**	**Seconds**	**Ratio**	**Seconds**	**Ratio**
410.bwaves	51.1	266	**51.1**	**266**	50.2	271	51.1	266	**51.1**	**266**	50.2	271
416.gamess	**864**	**22.7**	862	22.7	865	22.6	**807**	**24.3**	807	24.3	805	24.3
433.milc	**210**	**43.7**	210	43.8	211	43.4	208	44.2	**208**	**44.1**	210	43.8
434.zeusmp	74.1	123	**73.9**	**123**	73.8	123	74.1	123	**73.9**	**123**	73.8	123
435.gromacs	260	27.5	254	28.1	**255**	**28.0**	260	27.5	254	28.1	**255**	**28.0**
436.cactusADM	29.6	404	29.2	409	**29.4**	**407**	29.6	404	29.2	409	**29.4**	**407**
437.leslie3d	60.3	156	**60.4**	**156**	60.9	154	60.3	156	**60.4**	**156**	60.9	154
444.namd	**500**	**16.0**	500	16.0	500	16.0	487	16.5	487	16.5	**487**	**16.5**
447.dealII	362	31.6	**356**	**32.1**	356	32.1	362	31.6	**356**	**32.1**	356	32.1
450.soplex	337	24.7	343	24.3	**342**	**24.4**	337	24.7	343	24.3	**342**	**24.4**
453.povray	166	32.1	162	32.8	**165**	**32.3**	147	36.3	**148**	**36.1**	149	35.8
454.calculix	**258**	**31.9**	259	31.9	258	31.9	**244**	**33.9**	243	33.9	246	33.6
459.GemsFDTD	78.2	136	**78.3**	**135**	79.4	134	69.1	154	**69.5**	**153**	70.4	151
465.tonto	381	25.8	**381**	**25.9**	380	25.9	325	30.3	326	30.2	**325**	**30.3**
470.lbm	**36.6**	**376**	36.6	376	36.3	378	**36.6**	**376**	36.6	376	36.3	378
481.wrf	200	55.8	**199**	**56.2**	197	56.7	200	55.8	**199**	**56.2**	197	56.7
482.sphinx3	**402**	**48.4**	401	48.6	416	46.9	**406**	**48.0**	406	48.0	406	48.0

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
C1E 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
```

Continued on next page

SPEC CFP2006 Result
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Lenovo Group Limited

Lenovo ThinkServer RD450 (Intel Xeon E5-2609 v3, 1.90 GHz)

$SPECfp2006 = 63.6$

$SPECfp\_base2006 = 61.6$

CPU2006 license: 9017
Test sponsor: Lenovo Group Limited
Tested by: Lenovo Group Limited

Test date: Nov-2014
Hardware Availability: Dec-2014
Software Availability: Sep-2014

Platform Notes (Continued)

```
Sysinfo program /usr/cpu2006/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
running on RD450 Mon Nov 24 21:01:17 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 E5-2609 v3 @ 1.90GHz
      2 "physical id"s (chips)
      12 "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 : 6
      siblings  : 6
      physical 0: cores 0 1 2 3 4 5
      physical 1: cores 0 1 2 3 4 5
   cache size : 15360 KB

From /proc/meminfo
   MemTotal:       263860596 kB
   HugePages_Total:        0
   Hugepagesize:        2048 kB

From /etc/*release* /etc/*version*
   os-release:
      NAME="Red Hat Enterprise Linux Server"
      VERSION="7.0 (Maipo)"
      ID="rhel"
      ID_LIKE="fedora"
      VERSION_ID="7.0"
      PRETTY_NAME="Red Hat Enterprise Linux Server 7.0 (Maipo)"
      ANSI_COLOR="0;31"
      CPE_NAME="cpe:/o:redhat:enterprise_linux:7.0:GA:server"
   redhat-release: Red Hat Enterprise Linux Server release 7.0 (Maipo)
   system-release: Red Hat Enterprise Linux Server release 7.0 (Maipo)
   system-release-cpe: cpe:/o:redhat:enterprise_linux:7.0:ga:server

uname -a:
   Linux RD450 3.10.0-123.el7.x86_64 #1 SMP Mon May 5 11:16:57 EDT 2014 x86_64
   x86_64 x86_64 GNU/Linux

run-level 3 Nov 24 20:59

SPEC is set to: /usr/cpu2006
   Filesystem      Type  Size  Used Avail Use% Mounted on
   /dev/sda2       xfs   741G   84G  658G  12% /
Additional information from dmidecode:

   Warning: Use caution when you interpret this section. The 'dmidecode' program
```

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Platform Notes (Continued)

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 VB3TS110 10/05/2014
Memory:
16x Samsung M393A2G40DB0-CPB 16 GB 2 rank 2133 MHz, configured at 1600 MHz
```

(End of data from sysinfo program)
RD450 support 4 channels and 8 DIMMs per processor, total 8 channels and
16 DIMMs. All 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 = "12"

 Binaries compiled on a system with 1x Core i5-4670K CPU + 16GB
 memory using RedHat EL 7.0
 Transparent Huge Pages enabled with:
 echo always > /sys/kernel/mm/transparent_hugepage/enabled
```

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
```

Lenovo Group Limited

Lenovo ThinkServer RD450 (Intel Xeon E5-2609 v3, 1.90 GHz)

$\text{SPECfp2006} =$ 63.6

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CPU2006 license: 9017	**Test date:** Nov-2014
Test sponsor: Lenovo Group Limited	**Hardware Availability:** Dec-2014
Tested by: Lenovo Group Limited	**Software Availability:** Sep-2014

Base Portability Flags (Continued)

```
   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
      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
```

Lenovo Group Limited

Lenovo ThinkServer RD450 (Intel Xeon E5-2609 v3, 1.90 GHz)

$SPECfp2006 =$ 63.6

$SPECfp\_base2006 =$ 61.6

CPU2006 license: 9017
Test sponsor: Lenovo Group Limited
Tested by: Lenovo Group Limited

Test date: Nov-2014
Hardware Availability: Dec-2014
Software Availability: Sep-2014

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

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

Lenovo Group Limited

Lenovo ThinkServer RD450 (Intel Xeon E5-2609 v3, 1.90 GHz)

$SPECfp2006 = $ 63.6

$SPECfp_base2006 = $ 61.6

CPU2006 license: 9017	**Test date:** Nov-2014
Test sponsor: Lenovo Group Limited	**Hardware Availability:** Dec-2014
Tested by: Lenovo Group Limited	**Software Availability:** Sep-2014

Peak Optimization Flags (Continued)

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-ic15.0-official-linux64.html
http://www.spec.org/cpu2006/flags/Lenovo-Platform-Settings-V1.2-HSW-revA.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/Intel-ic15.0-official-linux64.xml
http://www.spec.org/cpu2006/flags/Lenovo-Platform-Settings-V1.2-HSW-revA.xml

For questions about this result, please contact the tester.
For other inquiries, please contact webmaster@spec.org.

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