SPEC® CFP2006 Result

Lenovo Group Limited

Lenovo ThinkServer RD550 (Intel Xeon E5-2667 v3, 3.20 GHz)

$SPECfp^{®}2006 =$ 115

$SPECfp\_base2006 =$ 111

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

Benchmark	base	peak
410.bwaves	526	
416.gamess	40.3	45.2
433.milc	74.4	74.7
434.zeusmp	197	
435.gromacs	49.6	
436.cactusADM	725	
437.leslie3d	305	
444.namd	28.2	29.1
447.dealII	60.4	
450.soplex	43.9	
453.povray	60.2	66.4
454.calculix	49.9	55.6
459.GemsFDTD	225	247
465.tonto	46.7	54.5
470.lbm	686	
481.wrf	120	
482.sphinx3	83.8	84.0

SPECfp_base2006 = 111
SPECfp2006 = 115

Hardware

CPU Name:	Intel Xeon E5-2667 v3
CPU Characteristics:	Intel Turbo Boost Technology up to 3.60 GHz
CPU MHz:	3200
FPU:	Integrated
CPU(s) enabled:	16 cores, 2 chips, 8 cores/chip, 2 threads/core
CPU(s) orderable:	1,2 chips
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 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

Continued on next page

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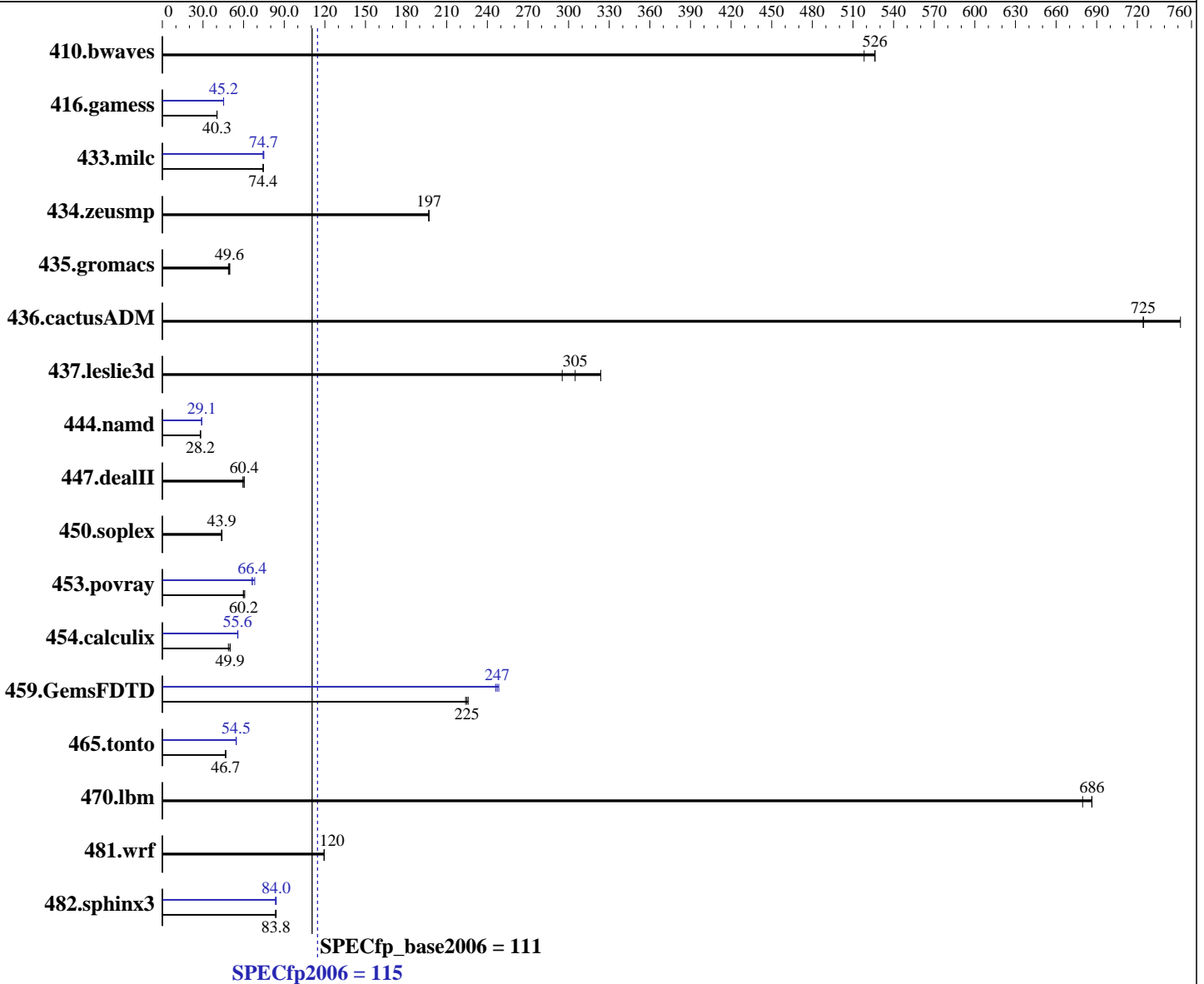|	
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L3 Cache:	20 MB I+D on chip per chip	System State:	Run level 3 (multi-user)
Other Cache:	None	Base Pointers:	64-bit
Memory:	256 GB (16 x 16 GB 2Rx4 PC4-2133P-R)	Peak Pointers:	32/64-bit
Disk Subsystem:	1 x 800 GB SATA SSD	Other Software:	None
Other Hardware:	None		

Results Table

Benchmark	Base						Peak					
	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	26.2	518	25.8	526	**25.8**	**526**	26.2	518	25.8	526	**25.8**	**526**
416.gamess	485	40.3	486	40.3	**485**	**40.3**	**433**	**45.2**	433	45.2	433	45.2
433.milc	**123**	**74.4**	123	74.6	123	74.4	122	75.0	123	74.4	**123**	**74.7**
434.zeusmp	**46.2**	**197**	46.2	197	46.2	197	**46.2**	**197**	46.2	197	46.2	197
435.gromacs	146	48.8	144	49.7	**144**	**49.6**	146	48.8	144	49.7	**144**	**49.6**
436.cactusADM	16.5	724	15.9	752	**16.5**	**725**	16.5	724	15.9	752	**16.5**	**725**
437.leslie3d	29.0	324	**30.8**	**305**	31.8	295	29.0	324	**30.8**	**305**	31.8	295
444.namd	285	28.2	285	28.1	**285**	**28.2**	**276**	**29.1**	276	29.1	276	29.1
447.dealII	192	59.5	**190**	**60.4**	189	60.4	192	59.5	**190**	**60.4**	189	60.4
450.soplex	189	44.0	191	43.6	**190**	**43.9**	189	44.0	191	43.6	**190**	**43.9**
453.povray	87.5	60.8	**88.4**	**60.2**	89.0	59.8	78.0	68.2	80.2	66.4	**80.1**	**66.4**
454.calculix	165	50.1	**165**	**49.9**	169	48.8	**148**	**55.6**	148	55.6	148	55.8
459.GemsFDTD	**47.2**	**225**	47.0	226	47.4	224	42.7	248	**42.9**	**247**	43.1	246
465.tonto	211	46.7	**211**	**46.7**	211	46.7	**180**	**54.5**	180	54.5	181	54.5
470.lbm	20.2	680	**20.0**	**686**	20.0	686	20.2	680	**20.0**	**686**	20.0	686
481.wrf	**93.4**	**120**	93.4	120	93.6	119	**93.4**	**120**	93.4	120	93.6	119
482.sphinx3	232	84.1	233	83.6	**233**	**83.8**	233	83.5	**232**	**84.0**	232	84.1

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
     Sysinfo program /usr/cpu2006/config/sysinfo.rev6818

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

Platform Notes (Continued)

```
$Rev: 6818 $ $Date:: 2012-07-17 #$ e86d102572650a6e4d596a3cee98f191
running on RD550 Thu Oct 16 23:32:13 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 E5-2667 v3 @ 3.20GHz
      2 "physical id"s (chips)
      32 "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 : 8
      siblings  : 16
      physical 0: cores 0 1 2 3 4 5 6 7
      physical 1: cores 0 1 2 3 4 5 6 7
   cache size : 20480 KB

From /proc/meminfo
   MemTotal:       264413884 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 Oct 16 23:30

SPEC is set to: /usr/cpu2006
   Filesystem      Type  Size  Used Avail Use% Mounted on
   /dev/sda2       ext4  730G   15G  679G   3% /

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 = "16"

 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-revC.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-revC.xml

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

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