SPEC® CFP2006 Result

Lenovo Group Limited

$SPECfp®\_rate2006 = 879$

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

$SPECfp\_rate\_base2006 = 851$

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

SPECfp_rate_base2006 = 851

SPECfp_rate2006 = 879

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

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:	No
File System:	ext4

Continued on next page

SPEC CFP2006 Result
Copyright 2006-2015 Standard Performance Evaluation Corporation

Lenovo Group Limited

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

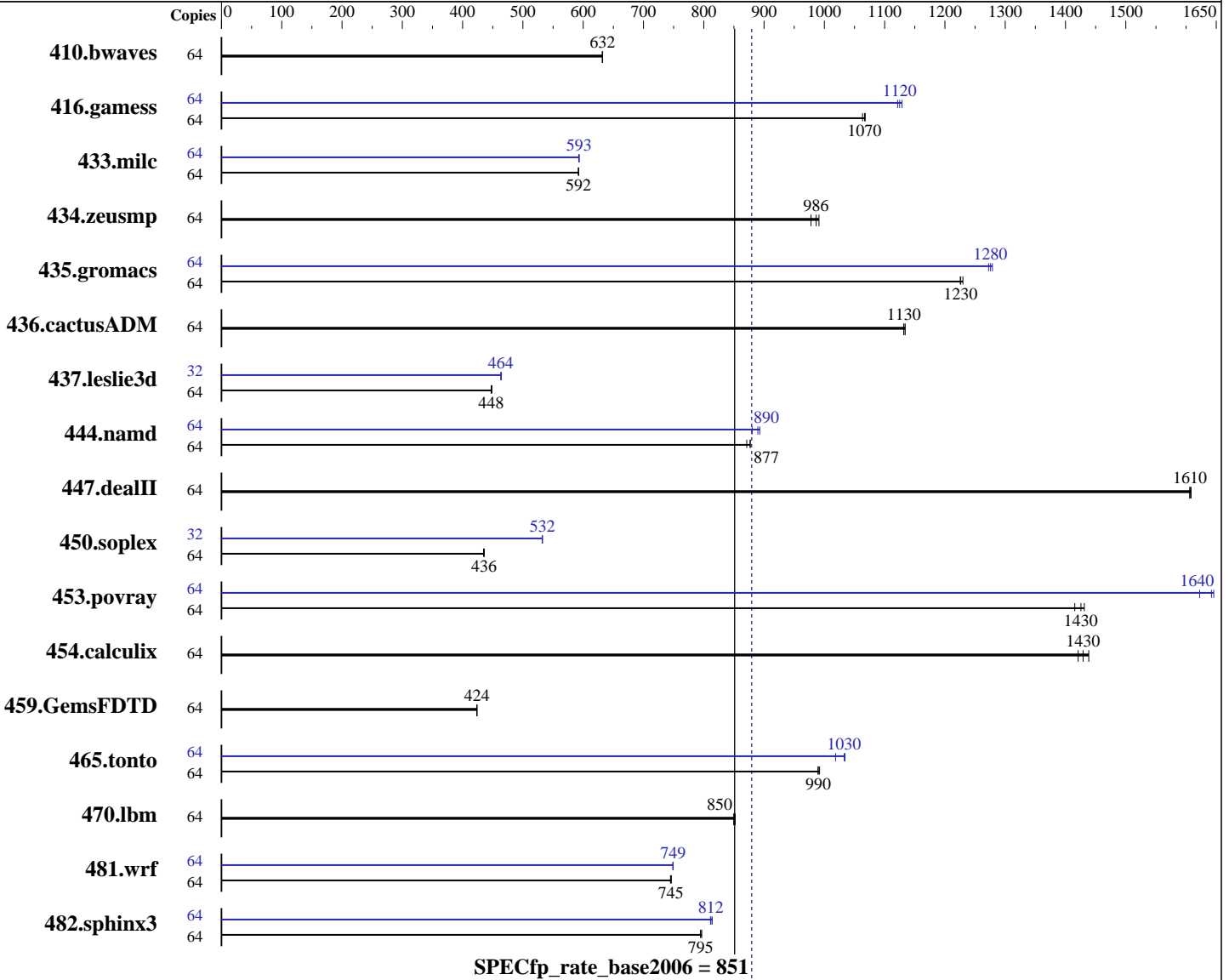| SPECfp_rate2006 =	879
SPECfp_rate_base2006 =	**851**

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

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:	32/64-bit
Peak Pointers:	32/64-bit
Other Software:	None

Results Table

Benchmark	Base Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Peak Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	64	**1376**	**632**	1377	632	1376	632	64	**1376**	**632**	1377	632	1376	632
416.gamess	64	**1175**	**1070**	1178	1060	1174	1070	64	1117	1120	1110	1130	**1114**	**1120**
433.milc	64	**992**	**592**	992	592	992	592	64	990	593	**990**	**593**	991	593
434.zeusmp	64	**590**	**986**	596	978	588	991	64	**590**	**986**	596	978	588	991
435.gromacs	64	**373**	**1230**	372	1230	373	1230	64	359	1270	357	1280	**358**	**1280**
436.cactusADM	64	676	1130	**676**	**1130**	674	1130	64	676	1130	**676**	**1130**	674	1130
437.leslie3d	64	1344	448	1341	449	**1344**	**448**	32	649	463	648	464	**649**	**464**
444.namd	64	**585**	**877**	585	877	589	871	64	575	893	**577**	**890**	583	880
447.dealII	64	455	1610	**456**	**1610**	456	1610	64	455	1610	**456**	**1610**	456	1610
450.soplex	64	1225	436	1228	435	**1225**	**436**	32	501	532	502	532	**501**	**532**
453.povray	64	238	1430	**239**	**1430**	241	1420	64	210	1620	**207**	**1640**	207	1650
454.calculix	64	**369**	**1430**	372	1420	367	1440	64	**369**	**1430**	372	1420	367	1440
459.GemsFDTD	64	1602	424	1603	424	**1603**	**424**	64	1602	424	1603	424	**1603**	**424**
465.tonto	64	**636**	**990**	636	989	635	992	64	618	1020	609	1030	**610**	**1030**
470.lbm	64	1032	852	1035	850	**1034**	**850**	64	1032	852	1035	850	**1034**	**850**
481.wrf	64	960	745	958	746	**959**	**745**	64	954	749	955	748	**954**	**749**
482.sphinx3	64	1566	797	1570	795	**1569**	**795**	64	**1536**	**812**	1538	811	1532	814

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl commands to bind each copy to a specific processor. For details, please see the config file.

Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"

Platform Notes

BIOS configuration:
Cluster On Die set to Enabled
Early Snoop set to Disabled

Continued on next page

Lenovo Group Limited

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

SPECfp_rate2006 =   879

SPECfp_rate_base2006 =   851

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

Platform Notes (Continued)

```
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
 $Rev: 6818 $ $Date:: 2012-07-17 #$ e86d102572650a6e4d596a3cee98f191
 running on RD650 Thu Oct 23 12:30:51 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 : 20480 KB

 From /proc/meminfo
    MemTotal:       264409016 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 23 00:14

 SPEC is set to: /usr/cpu2006
    Filesystem      Type  Size  Used Avail Use% Mounted on
    /dev/sda2       ext4  217G   68G  139G  33% /

 Additional information from dmidecode:
    BIOS LENOVO PB2TS110 10/06/2014
```

Continued on next page

SPEC CFP2006 Result

Lenovo Group Limited

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

$SPECfp\_rate2006 =$ 879

$SPECfp\_rate\_base2006 =$ 851

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

Platform Notes (Continued)

```
    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
 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:
 LD_LIBRARY_PATH = "/usr/cpu2006/libs/32:/usr/cpu2006/libs/64:/usr/cpu2006/sh"

  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
  Filesystem page cache cleared with:
  echo 1>        /proc/sys/vm/drop_caches
  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
```

SPEC CFP2006 Result
Copyright 2006-2015 Standard Performance Evaluation Corporation

Lenovo Group Limited

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

$SPECfp\_rate2006 =$ 879

$SPECfp\_rate\_base2006 =$ 851

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

Base Portability Flags (Continued)

```
  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 -opt-prefetch -auto-p32
-ansi-alias -opt-mem-layout-trans=3
```

C++ benchmarks:
```
-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32
-ansi-alias -opt-mem-layout-trans=3
```

Fortran benchmarks:
```
-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch
```

Benchmarks using both Fortran and C:
```
-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32
-ansi-alias -opt-mem-layout-trans=3
```

Peak Compiler Invocation

C benchmarks (except as noted below):
```
icc    -m64
```

```
482.sphinx3: icc -m32
```

C++ benchmarks (except as noted below):
```
icpc   -m64
```

```
450.soplex: icpc -m32
```

Fortran benchmarks:
```
ifort -m64
```

Benchmarks using both Fortran and C:
```
icc    -m64 ifort -m64
```

SPEC CFP2006 Result
Copyright 2006-2015 Standard Performance Evaluation Corporation

Lenovo Group Limited

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

$SPECfp_rate2006 = $ 879

$SPECfp_rate_base2006 = $ 851

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

Peak 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
    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
```

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)
                -opt-mem-layout-trans=3(pass 2) -prof-use(pass 2)
                -auto-ilp32

      470.lbm: basepeak = yes

   482.sphinx3: -xCORE-AVX2 -ipo -O3 -no-prec-div -opt-mem-layout-trans=3
                -unroll2
```

C++ benchmarks:

```
      444.namd: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)
                -O3(pass 2) -no-prec-div(pass 2)
                -opt-mem-layout-trans=3(pass 2) -prof-use(pass 2) -fno-alias
                -auto-ilp32

     447.dealII: basepeak = yes

    450.soplex: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)
                -O3(pass 2) -no-prec-div(pass 2)
                -opt-mem-layout-trans=3(pass 2) -prof-use(pass 2)
                -opt-malloc-options=3

    453.povray: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)
                -O3(pass 2) -no-prec-div(pass 2)
                -opt-mem-layout-trans=3(pass 2) -prof-use(pass 2) -unroll4
                -ansi-alias
```

Continued on next page

Lenovo Group Limited

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

$SPECfp_rate2006 = $ 879

$SPECfp_rate_base2006 = $ 851

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

Peak Optimization Flags (Continued)

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: `-xCORE-AVX2` `-ipo` `-O3` `-no-prec-div` `-opt-prefetch`

459.GemsFDTD: basepeak = yes

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

Benchmarks using both Fortran and C:

435.gromacs: `-xCORE-AVX2`(pass 2) `-prof-gen`(pass 1) `-ipo`(pass 2)
`-O3`(pass 2) `-no-prec-div`(pass 2)
`-opt-mem-layout-trans=3`(pass 2) `-prof-use`(pass 2)
`-opt-prefetch` `-auto-ilp32`

436.cactusADM: basepeak = yes

454.calculix: basepeak = yes

481.wrf: `-xCORE-AVX2` `-ipo` `-O3` `-no-prec-div` `-auto-ilp32`

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

SPEC CFP2006 Result

Copyright 2006-2015 Standard Performance Evaluation Corporation

Lenovo Group Limited

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

$SPECfp\_rate2006 =$ **879**

$SPECfp\_rate\_base2006 =$ **851**

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

SPEC and SPECfp are registered trademarks of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

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

Tested with SPEC CPU2006 v1.2.
Report generated on Tue Jan 27 13:32:49 2015 by SPEC CPU2006 PS/PDF formatter v6932.
Originally published on 27 January 2015.