SPEC® CFP2006 Result
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Lenovo Group Limited

Lenovo ThinkServer RD650 (Intel Xeon E5-2680 v3, 2.50 GHz)

$SPECfp^®_rate2006 = $ 778

$SPECfp_rate_base2006 = $ 755

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

Copies

Benchmark	Copies	Result
410.bwaves	48	601
416.gamess	48	909
416.gamess	48	863
433.milc	48	574
433.milc	48	574
434.zeusmp	48	890
435.gromacs	48	1030
435.gromacs	48	1000
436.cactusADM	48	1010
437.leslie3d	24	449
437.leslie3d	48	424
444.namd	48	710
444.namd	48	698
447.dealII	48	1330
450.soplex	24	491
450.soplex	48	416
453.povray	48	1310
453.povray	48	1150
454.calculix	48	1170
459.GemsFDTD	48	401
465.tonto	48	891
465.tonto	48	855
470.lbm	48	798
481.wrf	48	721
481.wrf	48	713
482.sphinx3	48	727
482.sphinx3	48	727

SPECfp_rate_base2006 = 755

SPECfp_rate2006 = 778

Hardware

CPU Name: Intel Xeon E5-2680 v3
CPU Characteristics: Intel Turbo Boost Technology up to 3.30 GHz
CPU MHz: 2500
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

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

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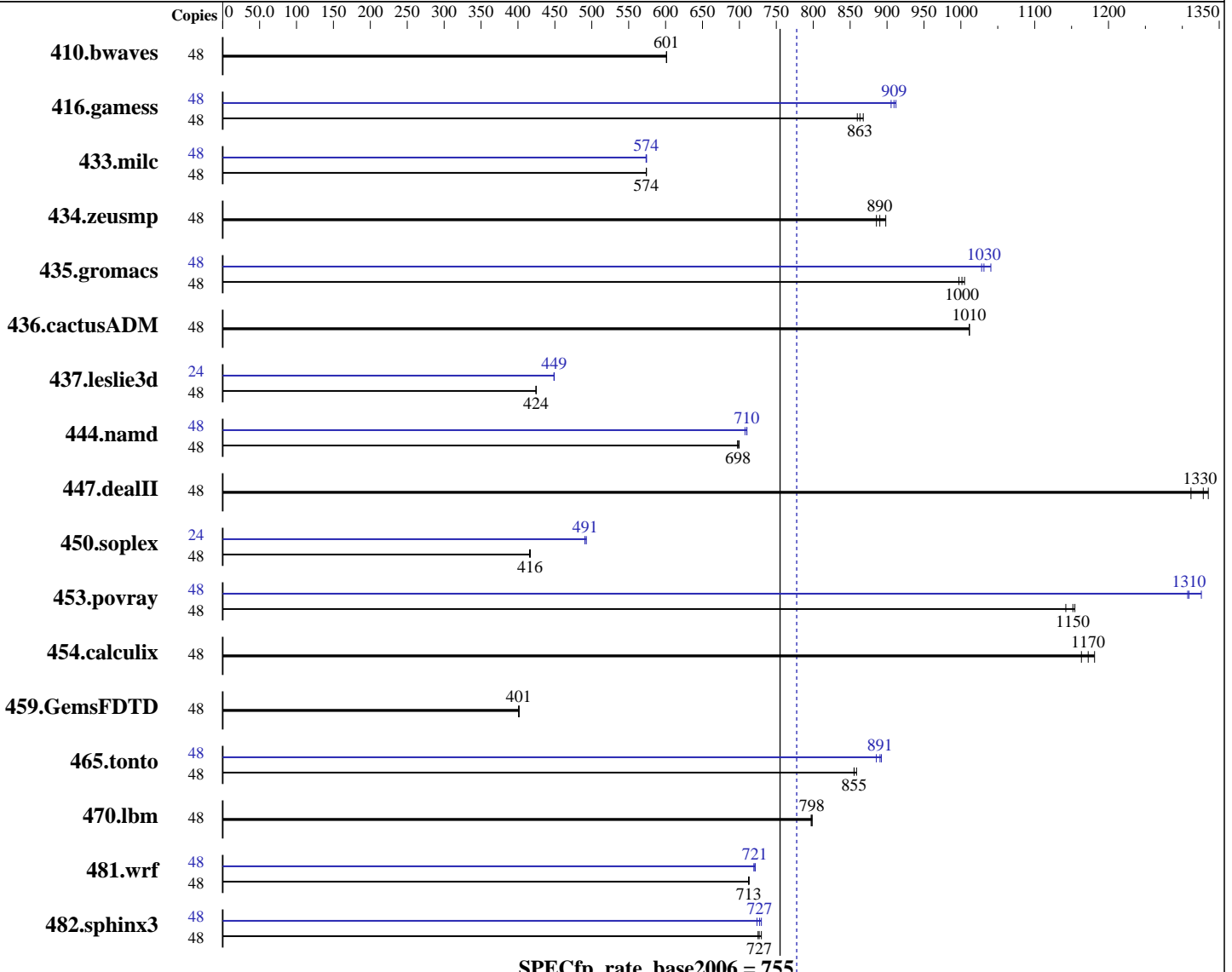
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L3 Cache:	30 MB I+D on chip per chip
Other Cache:	None
Memory:	256 GB (16 x 16 GB 2Rx4 PC4-2133P-R)
Disk Subsystem:	1 x 240 GB SATA SSD
Other Hardware:	None

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	48	1084	601	**1085**	**601**	1085	601	48	1084	601	**1085**	**601**	1085	601
416.gamess	48	1083	868	**1089**	**863**	1093	860	48	**1033**	**909**	1030	912	1038	905
433.milc	48	768	574	768	574	**768**	**574**	48	767	574	**768**	**574**	768	574
434.zeusmp	48	486	898	**491**	**890**	493	886	48	486	898	**491**	**890**	493	886
435.gromacs	48	344	997	**342**	**1000**	341	1010	48	**332**	**1030**	329	1040	333	1030
436.cactusADM	48	567	1010	567	1010	**567**	**1010**	48	567	1010	567	1010	**567**	**1010**
437.leslie3d	48	**1063**	**424**	1063	424	1062	425	24	**502**	**449**	502	449	503	449
444.namd	48	552	698	**551**	**698**	550	700	48	544	708	**542**	**710**	542	710
447.dealII	48	419	1310	**413**	**1330**	411	1340	48	419	1310	**413**	**1330**	411	1340
450.soplex	48	961	417	963	416	**962**	**416**	24	406	493	408	491	**408**	**491**
453.povray	48	221	1150	224	1140	**222**	**1150**	48	**195**	**1310**	193	1330	195	1310
454.calculix	48	**338**	**1170**	340	1160	335	1180	48	**338**	**1170**	340	1160	335	1180
459.GemsFDTD	48	1268	402	1270	401	**1269**	**401**	48	1268	402	1270	401	**1269**	**401**
465.tonto	48	550	859	552	855	**552**	**855**	48	533	886	529	892	**530**	**891**
470.lbm	48	**826**	**798**	827	797	826	799	48	**826**	**798**	827	797	826	799
481.wrf	48	753	712	**752**	**713**	752	713	48	**744**	**721**	743	722	745	720
482.sphinx3	48	1290	725	1282	730	**1287**	**727**	48	1282	730	**1286**	**727**	1292	724

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

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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 30 00:24:20 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 E5-2680 v3 @ 2.50GHz
       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 : 15360 KB

 From /proc/meminfo
    MemTotal:       264411008 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 30 00:22

 SPEC is set to: /usr/cpu2006
    Filesystem      Type  Size  Used Avail Use% Mounted on
    /dev/sda2       ext4  217G   12G  195G   6% /

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

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Platform Notes (Continued)

```
    Memory:
     16x   16 GB
     16x Hynix Semiconductor HMA42GR7MFR4N-TFTD 16 GB 2133 MHz 2 rank
     8x NO DIMM NO DIMM

  (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
```

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Lenovo ThinkServer RD650 (Intel Xeon E5-2680 v3, 2.50 GHz)

SPECfp_rate2006 =   778

SPECfp_rate_base2006 =   755

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

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
```

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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
```

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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

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

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