SPEC® CFP2006 Result
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Lenovo Group Limited

Lenovo ThinkServer TD350 (Intel Xeon E5-2680 v3, 2.50 GHz)

$SPECfp®\_rate2006 = \quad 769$

$SPECfp\_rate\_base2006 = \quad 748$
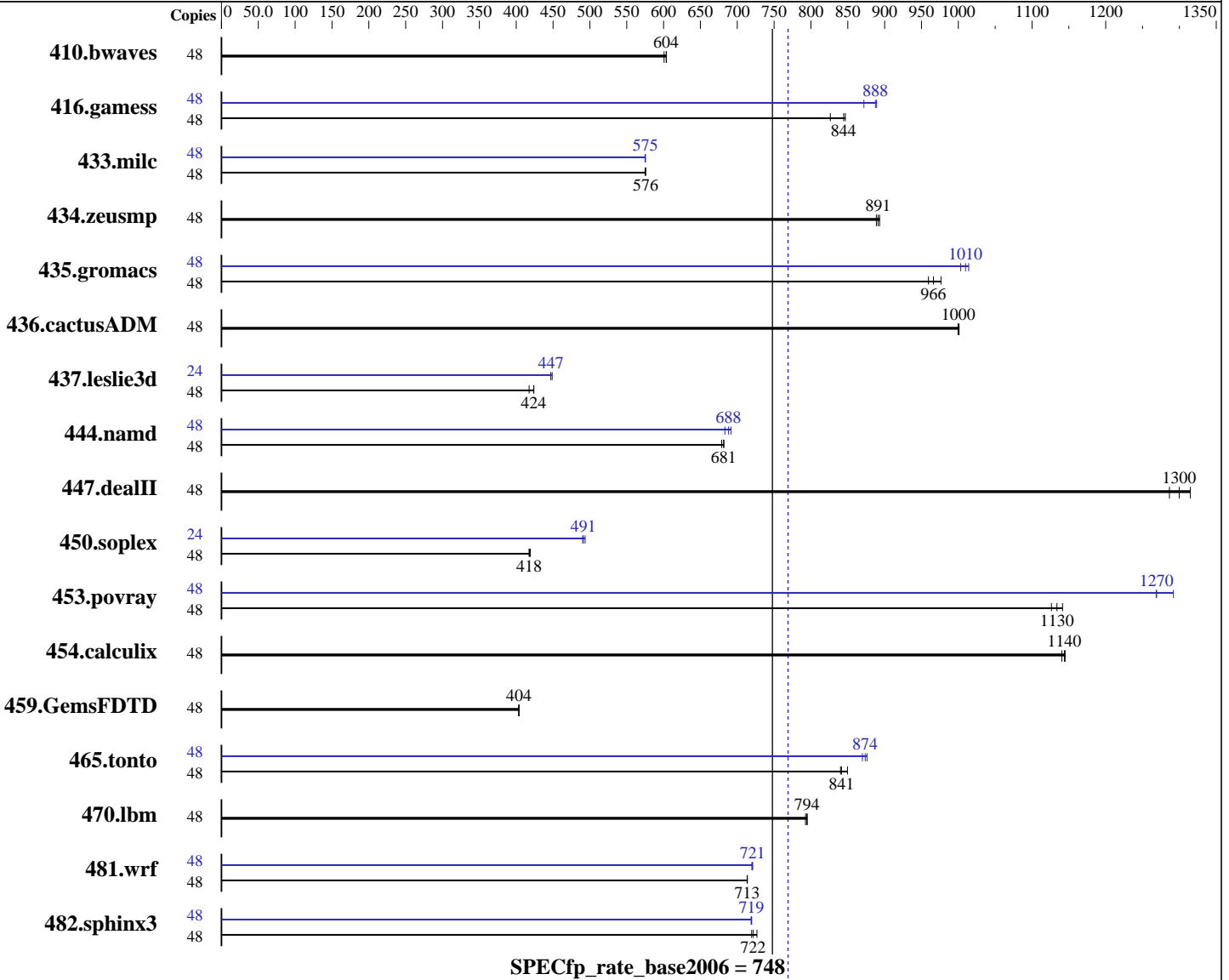
CPU2006 license: 9017
Test sponsor: Lenovo Group Limited
Tested by: Lenovo Group Limited

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

SPECfp_rate_base2006 = 748

SPECfp_rate2006 = 769

Benchmark	Copies	Result
410.bwaves	48	604
416.gamess	48 / 48	888 / 844
433.milc	48 / 48	575 / 576
434.zeusmp	48	891
435.gromacs	48 / 48	1010 / 966
436.cactusADM	48	1000
437.leslie3d	24 / 48	447 / 424
444.namd	48 / 48	688 / 681
447.dealII	48	1300
450.soplex	24 / 48	491 / 418
453.povray	48 / 48	1270 / 1130
454.calculix	48	1140
459.GemsFDTD	48	404
465.tonto	48 / 48	874 / 841
470.lbm	48	794
481.wrf	48 / 48	721 / 713
482.sphinx3	48 / 48	719 / 722

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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L3 Cache:	30 MB I+D on chip per chip	System State:	Run level 3 (multi-user)
Other Cache:	None	Base Pointers:	32/64-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 Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Peak Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	48	**1081**	**604**	1086	601	1080	604	48	**1081**	**604**	1086	601	1080	604
416.gamess	48	**1113**	**844**	1137	826	1110	847	48	**1059**	**888**	1078	872	1057	889
433.milc	48	766	575	**766**	**576**	765	576	48	766	575	766	575	**766**	**575**
434.zeusmp	48	**490**	**891**	489	893	491	889	48	**490**	**891**	489	893	491	889
435.gromacs	48	357	959	**355**	**966**	351	976	48	342	1000	338	1010	**339**	**1010**
436.cactusADM	48	574	1000	**574**	**1000**	573	1000	48	574	1000	**574**	**1000**	573	1000
437.leslie3d	48	1081	418	**1065**	**424**	1064	424	24	505	447	**505**	**447**	503	449
444.namd	48	**565**	**681**	567	679	565	682	48	557	691	**559**	**688**	563	683
447.dealII	48	427	1290	418	1310	**422**	**1300**	48	427	1290	418	1310	**422**	**1300**
450.soplex	48	955	419	**958**	**418**	959	418	24	408	490	406	494	**407**	**491**
453.povray	48	227	1130	**225**	**1130**	224	1140	48	**201**	**1270**	198	1290	201	1270
454.calculix	48	**346**	**1140**	347	1140	346	1140	48	**346**	**1140**	347	1140	346	1140
459.GemsFDTD	48	1261	404	**1262**	**404**	1262	403	48	1261	404	**1262**	**404**	1262	403
465.tonto	48	**561**	**841**	556	850	562	840	48	**541**	**874**	543	870	539	876
470.lbm	48	830	795	832	793	**830**	**794**	48	830	795	832	793	**830**	**794**
481.wrf	48	752	713	**751**	**713**	751	714	48	745	720	**744**	**721**	744	721
482.sphinx3	48	1300	720	1287	727	**1296**	**722**	48	**1301**	**719**	1300	720	1302	719

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 Max Performance
Memory Power Savings set to Disabled
 Sysinfo program /usr/cpu2006/config/sysinfo.rev6818
 $Rev: 6818 $ $Date:: 2012-07-17 #$ e86d102572650a6e4d596a3cee98f191
 running on TD350 Thu Nov  6 23:00:40 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:       264411056 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 TD350 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 Nov 6 23:00

 SPEC is set to: /usr/cpu2006
    Filesystem      Type  Size  Used Avail Use% Mounted on
    /dev/sda2       ext4  730G   61G  632G   9% /

 Additional information from dmidecode:
   BIOS LENOVO TB5TS110 10/06/2014
```

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Platform Notes (Continued)

```
     Memory:
       16x   16 GB
       2x Hynix Semiconductor HMA42GR7MFR4N-TF 16 GB 2133 MHz 2 rank
       14x Hynix Semiconductor HMA42GR7MFR4N-TFTD 16 GB 2133 MHz 2 rank

   (End of data from sysinfo program)
  TD350 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:
  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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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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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-TD350-revA.html

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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-TD350-revA.xml

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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 13:31:28 2015 by SPEC CPU2006 PS/PDF formatter v6932.
Originally published on 27 January 2015.