SPEC® CFP2006 Result
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Lenovo Group Limited

Lenovo ThinkServer TD350 (Intel Xeon E5-2667 v3, 3.20 GHz)

$SPECfp^{®}2006 =$ 115

$SPECfp\_base2006 =$ 111

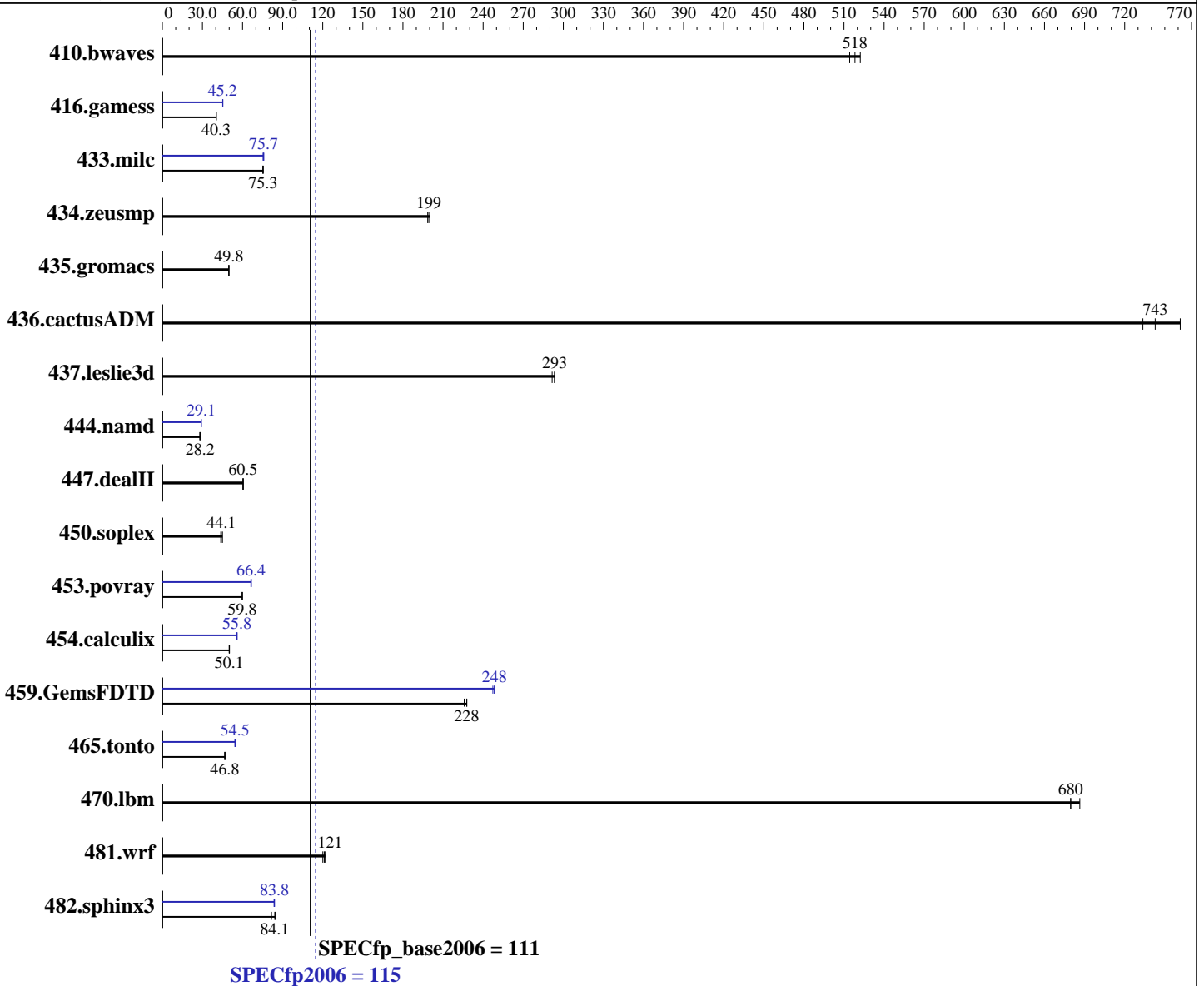|	
CPU2006 license: 9017	**Test date:** Oct-2014
Test sponsor: Lenovo Group Limited	**Hardware Availability:** Sep-2014
Tested by: Lenovo Group Limited	**Software Availability:** Nov-2014

410.bwaves 518
416.gamess 45.2 / 40.3
433.milc 75.7 / 75.3
434.zeusmp 199
435.gromacs 49.8
436.cactusADM 743
437.leslie3d 293
444.namd 29.1 / 28.2
447.dealII 60.5
450.soplex 44.1
453.povray 66.4 / 59.8
454.calculix 55.8 / 50.1
459.GemsFDTD 248 / 228
465.tonto 54.5 / 46.8
470.lbm 680
481.wrf 121
482.sphinx3 83.8 / 84.1

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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

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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**	26.4	514	26.0	522	**26.2**	**518**	26.4	514	26.0	522
416.gamess	**486**	**40.3**	485	40.3	487	40.2	434	45.1	**434**	**45.2**	432	45.3
433.milc	122	75.2	122	75.5	**122**	**75.3**	121	75.9	122	75.3	**121**	**75.7**
434.zeusmp	**45.6**	**199**	45.4	200	45.8	199	**45.6**	**199**	45.4	200	45.8	199
435.gromacs	**144**	**49.8**	143	49.8	144	49.7	**144**	**49.8**	143	49.8	144	49.7
436.cactusADM	**16.1**	**743**	16.3	734	15.7	762	**16.1**	**743**	16.3	734	15.7	762
437.leslie3d	32.2	292	32.0	293	**32.0**	**293**	32.2	292	32.0	293	**32.0**	**293**
444.namd	285	28.2	285	28.2	**285**	**28.2**	**276**	**29.1**	276	29.1	276	29.1
447.dealII	**189**	**60.5**	190	60.3	189	60.5	**189**	**60.5**	190	60.3	189	60.5
450.soplex	185	45.0	191	43.7	**189**	**44.1**	185	45.0	191	43.7	**189**	**44.1**
453.povray	89.1	59.7	**89.0**	**59.8**	88.9	59.9	79.9	66.6	**80.1**	**66.4**	80.3	66.3
454.calculix	**165**	**50.1**	164	50.2	165	50.0	148	55.9	148	55.8	**148**	**55.8**
459.GemsFDTD	**46.6**	**228**	46.6	228	47.0	226	42.7	248	42.9	247	**42.7**	**248**
465.tonto	**210**	**46.8**	210	46.9	211	46.6	181	54.3	**181**	**54.5**	180	54.7
470.lbm	20.0	686	**20.2**	**680**	20.2	680	20.0	686	**20.2**	**680**	20.2	680
481.wrf	**92.2**	**121**	93.0	120	91.6	122	**92.2**	**121**	93.0	120	91.6	122
482.sphinx3	239	81.7	**232**	**84.1**	231	84.4	232	83.9	**232**	**83.8**	233	83.6

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 Max Performance
Memory Power Savings set to Disabled
 Sysinfo program /usr/cpu2006/config/sysinfo.rev6818
```

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Platform Notes (Continued)

```
    $Rev: 6818 $ $Date:: 2012-07-17 #$ e86d102572650a6e4d596a3cee98f191
    running on TD350 Mon Oct 20 18:30:45 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:       264413660 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 Oct 20 18:29

    SPEC is set to: /usr/cpu2006
       Filesystem      Type  Size  Used Avail Use% Mounted on
       /dev/sda2       ext4  730G   66G  628G  10% /

    Additional information from dmidecode:
      BIOS LENOVO TB5TS110 10/06/2014
      Memory:
       16x   16 GB
       16x Samsung M393A2G40DB0-CPB 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.
```

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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
     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
```

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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
```

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
```

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Peak Optimization Flags (Continued)

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

  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-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-revA.xml

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

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