SPEC® CFP2006 Result

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Lenovo Group Limited

$SPECfp®\_rate2006 = 876$

Lenovo System x3500 M5
(Intel Xeon E5-2698 v3, 2.30 GHz)
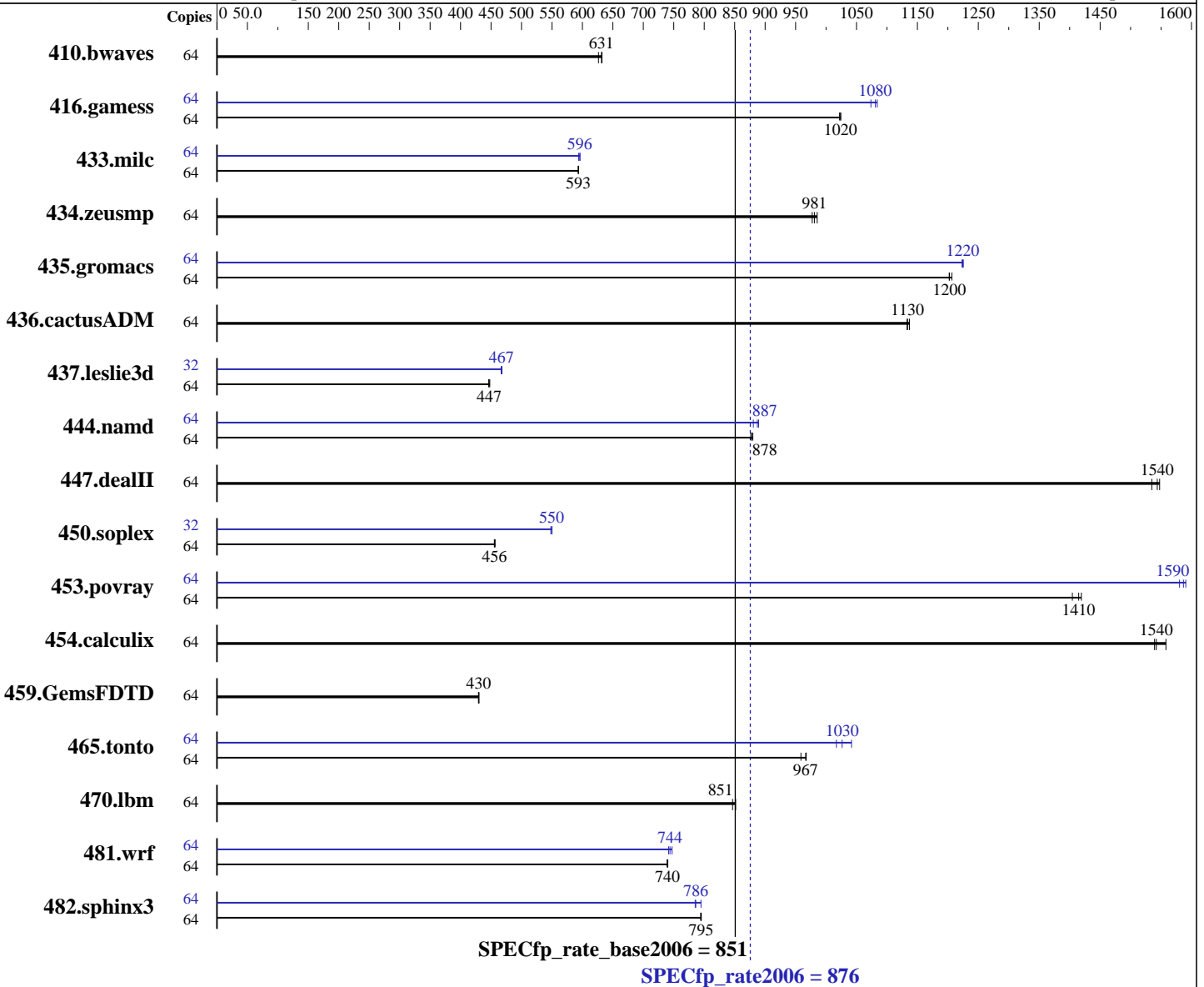
$SPECfp\_rate\_base2006 = 851$

Copies	Benchmark	Result
64	410.bwaves	631
64	416.gamess	1080
64	416.gamess	1020
64	433.milc	596
64	433.milc	593
64	434.zeusmp	981
64	435.gromacs	1220
64	435.gromacs	1200
64	436.cactusADM	1130
32	437.leslie3d	467
64	437.leslie3d	447
64	444.namd	887
64	444.namd	878
64	447.dealII	1540
32	450.soplex	550
64	450.soplex	456
64	453.povray	1590
64	453.povray	1410
64	454.calculix	1540
64	459.GemsFDTD	430
64	465.tonto	1030
64	465.tonto	967
64	470.lbm	851
64	481.wrf	744
64	481.wrf	740
64	482.sphinx3	786
64	482.sphinx3	795

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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 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 7.0 (Maipo)
	3.10.0-123.el7.x86_64
Compiler:	C/C++: Version 15.0.0.090 of Intel C++ Studio XE for Linux;
	Fortran: Version 15.0.0.090 of Intel Fortran Studio XE for Linux
Auto Parallel:	No
File System:	xfs

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CPU2006 license: 9017	**Test date:** Aug-2015
Test sponsor: Lenovo Group Limited	**Hardware Availability:** Jan-2015
Tested by: Lenovo Group Limited	**Software Availability:** Sep-2014

L3 Cache:	40 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 960 GB SATA SSD	Other Software:	None
Other Hardware:	None		

Results Table

Benchmark	Base						Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	64	1376	632	1388	626	**1378**	**631**	64	1376	632	1388	626	**1378**	**631**
416.gamess	64	1226	1020	1224	1020	**1224**	**1020**	64	1167	1070	**1159**	**1080**	1156	1080
433.milc	64	991	593	**990**	**593**	990	594	64	986	596	**986**	**596**	989	594
434.zeusmp	64	596	977	**594**	**981**	591	985	64	596	977	**594**	**981**	591	985
435.gromacs	64	379	1210	380	1200	**380**	**1200**	64	373	1230	**373**	**1220**	374	1220
436.cactusADM	64	675	1130	673	1140	**675**	**1130**	64	675	1130	673	1140	**675**	**1130**
437.leslie3d	64	1348	446	**1346**	**447**	1343	448	32	645	467	643	468	**644**	**467**
444.namd	64	583	880	**585**	**878**	586	876	64	**579**	**887**	577	889	583	881
447.dealII	64	473	1550	477	1530	**474**	**1540**	64	473	1550	477	1530	**474**	**1540**
450.soplex	64	1169	457	**1171**	**456**	1172	455	32	**485**	**550**	487	548	485	550
453.povray	64	**241**	**1410**	240	1420	242	1400	64	214	1590	**215**	**1590**	215	1580
454.calculix	64	339	1560	343	1540	**342**	**1540**	64	339	1560	343	1540	**342**	**1540**
459.GemsFDTD	64	1581	429	**1580**	**430**	1578	430	64	1581	429	**1580**	**430**	1578	430
465.tonto	64	**652**	**967**	657	959	651	968	64	604	1040	619	1020	**614**	**1030**
470.lbm	64	1039	847	1033	851	**1033**	**851**	64	1039	847	1033	851	**1033**	**851**
481.wrf	64	**966**	**740**	966	740	968	739	64	**961**	**744**	964	742	957	747
482.sphinx3	64	**1569**	**795**	1569	795	1571	794	64	1589	785	**1587**	**786**	1570	795

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 setting:
Operating Mode set to "Efficiency-Favor Performance"
Sysinfo program /home/SPEC/config/sysinfo.rev6914

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Platform Notes (Continued)

```
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
running on x3500M5 Thu Aug 27 13:35:36 2015

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 : 8
      siblings  : 16
      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:       263451612 kB
   HugePages_Total:        0
   Hugepagesize:        2048 kB

From /etc/*release* /etc/*version*
   os-release:
      NAME="Red Hat Enterprise Linux Server"
      VERSION="7.0 (Maipo)"
      ID="rhel"
      ID_LIKE="fedora"
      VERSION_ID="7.0"
      PRETTY_NAME="Red Hat Enterprise Linux Server 7.0 (Maipo)"
      ANSI_COLOR="0;31"
      CPE_NAME="cpe:/o:redhat:enterprise_linux:7.0:GA:server"
   redhat-release: Red Hat Enterprise Linux Server release 7.0 (Maipo)
   system-release: Red Hat Enterprise Linux Server release 7.0 (Maipo)
   system-release-cpe: cpe:/o:redhat:enterprise_linux:7.0:ga:server

uname -a:
   Linux x3500M5 3.10.0-123.el7.x86_64 #1 SMP Mon May 5 11:16:57 EDT 2014 x86_64
   x86_64 x86_64 GNU/Linux


SPEC is set to: /home/SPEC
   Filesystem          Type  Size  Used Avail Use% Mounted on
   /dev/mapper/rhel-root xfs  927G  193G  734G  21% /
Additional information from dmidecode:

   Warning: Use caution when you interpret this section. The 'dmidecode' program
   reads system data which is "intended to allow hardware to be accurately
   determined", but the intent may not be met, as there are frequent changes to
```

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Platform Notes (Continued)

```
    hardware, firmware, and the "DMTF SMBIOS" standard.

    BIOS IBM -[TAE105J-1.10]- 04/20/2015
    Memory:
     16x Hynix HMA42GR7MFR4N-TFT1 16 GB 2 rank 2133 MHz
     8x NO DIMM Unknown

  (End of data from sysinfo program)
```

General Notes

```
Environment variables set by runspec before the start of the run:
LD_LIBRARY_PATH = "/home/SPEC/libs/32:/home/SPEC/libs/64:/home/SPEC/sh"

 Binaries compiled on a system with 1x Core i5-4670K CPU + 16GB
 memory using RedHat EL 7.0
 Transparent Huge Pages enabled with:
 echo always > /sys/kernel/mm/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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Software Availability: Sep-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:
```
icc     -m64
```

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

  450.soplex: icpc -m32 -L/opt/intel/composer_xe_2015/lib/ia32
```

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
   482.sphinx3: -DSPEC_CPU_LP64
```

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-ic15.0-official-linux64.html
http://www.spec.org/cpu2006/flags/Lenovo-Platform-Flags-V1.2-HSW-B.20150923.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-ic15.0-official-linux64.xml
http://www.spec.org/cpu2006/flags/Lenovo-Platform-Flags-V1.2-HSW-B.20150923.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 Wed Sep 23 11:04:01 2015 by SPEC CPU2006 PS/PDF formatter v6932.
Originally published on 22 September 2015.