SPEC® CFP2006 Result

Lenovo Group Limited

$SPECfp^{®}2006 =$ 104

Lenovo System x3650 M5
(Intel Xeon E5-2658 v3, 2.20 GHz)

$SPECfp\_base2006 =$ 100

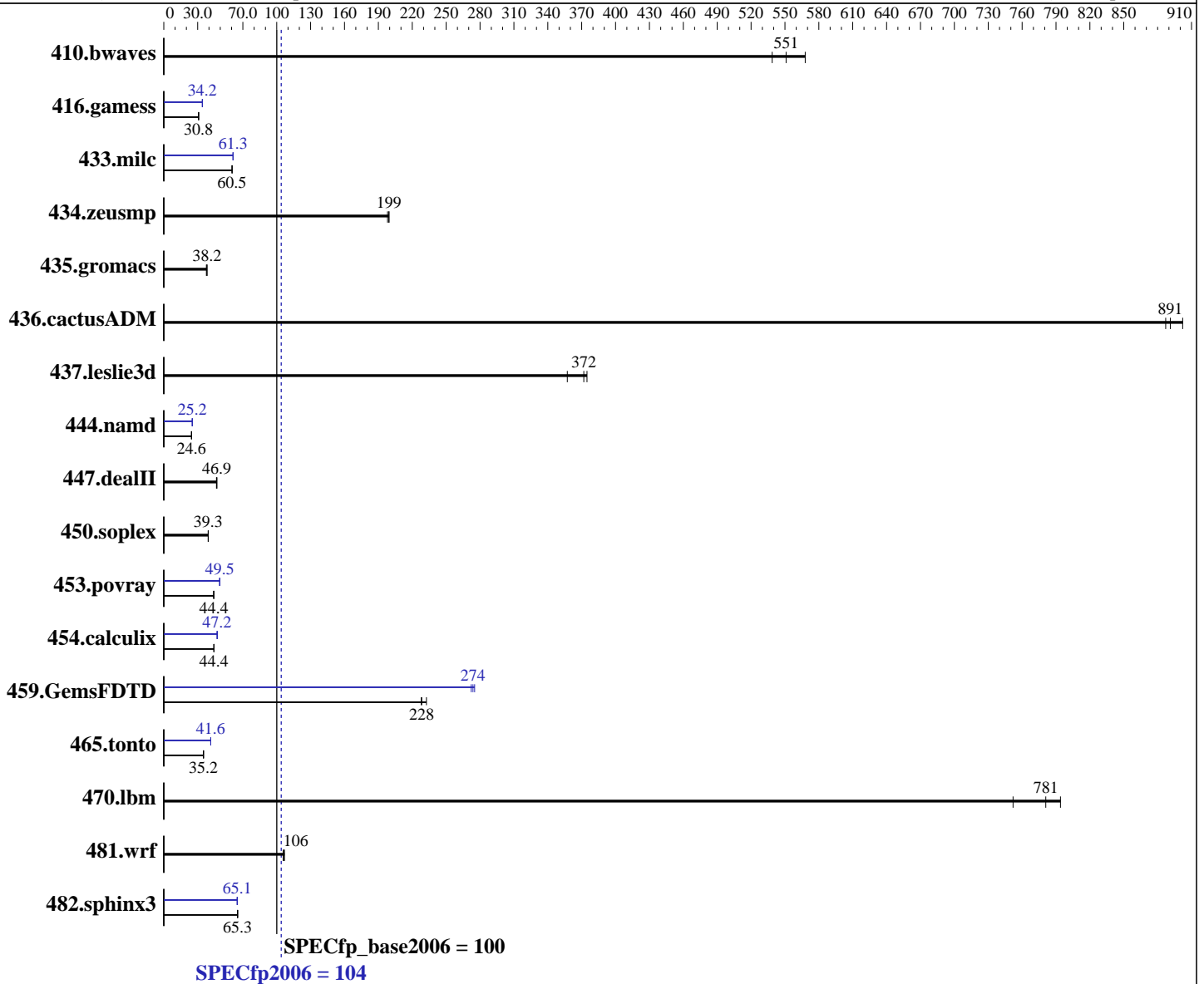|			
CPU2006 license:	9017	**Test date:**	Mar-2015
Test sponsor:	Lenovo Group Limited	**Hardware Availability:**	Oct-2014
Tested by:	Lenovo Group Limited	**Software Availability:**	Sep-2014

0 30.0 70.0 100 130 160 190 220 250 280 310 340 370 400 430 460 490 520 550 580 610 640 670 700 730 760 790 820 850 910

- **410.bwaves** 551
- **416.gamess** 34.2 / 30.8
- **433.milc** 61.3 / 60.5
- **434.zeusmp** 199
- **435.gromacs** 38.2
- **436.cactusADM** 891
- **437.leslie3d** 372
- **444.namd** 25.2 / 24.6
- **447.dealII** 46.9
- **450.soplex** 39.3
- **453.povray** 49.5 / 44.4
- **454.calculix** 47.2 / 44.4
- **459.GemsFDTD** 274 / 228
- **465.tonto** 41.6 / 35.2
- **470.lbm** 781
- **481.wrf** 106
- **482.sphinx3** 65.1 / 65.3

SPECfp_base2006 = 100

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Hardware

CPU Name:	Intel Xeon E5-2658 v3
CPU Characteristics:	Intel Turbo Boost Technology up to 2.90 GHz
CPU MHz:	2200
FPU:	Integrated
CPU(s) enabled:	24 cores, 2 chips, 12 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:	Yes
File System:	xfs

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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:	64-bit
Memory:	256 GB (16 x 16 GB 2Rx4 PC4-2133P-R)	Peak Pointers:	32/64-bit
Disk Subsystem:	1 x 1000 GB SATA, 7200 RPM	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	23.9	568	**24.7**	**551**	25.2	539	23.9	568	**24.7**	**551**	25.2	539
416.gamess	633	30.9	**636**	**30.8**	636	30.8	**573**	**34.2**	573	34.2	574	34.1
433.milc	152	60.6	**152**	**60.5**	152	60.4	**150**	**61.3**	150	61.3	149	61.4
434.zeusmp	45.9	198	45.6	199	**45.7**	**199**	45.9	198	45.6	199	**45.7**	**199**
435.gromacs	187	38.3	189	37.7	**187**	**38.2**	187	38.3	189	37.7	**187**	**38.2**
436.cactusADM	**13.4**	**891**	13.5	887	13.2	902	**13.4**	**891**	13.5	887	13.2	902
437.leslie3d	26.3	357	25.1	375	**25.3**	**372**	26.3	357	25.1	375	**25.3**	**372**
444.namd	**327**	**24.6**	327	24.5	327	24.6	318	25.2	318	25.2	**318**	**25.2**
447.dealII	244	47.0	245	46.6	**244**	**46.9**	244	47.0	245	46.6	**244**	**46.9**
450.soplex	212	39.3	212	39.4	**212**	**39.3**	212	39.3	212	39.4	**212**	**39.3**
453.povray	120	44.4	121	44.0	**120**	**44.4**	**108**	**49.5**	107	49.7	108	49.4
454.calculix	**186**	**44.4**	186	44.4	186	44.3	174	47.5	175	47.2	**175**	**47.2**
459.GemsFDTD	45.6	233	46.5	228	**46.5**	**228**	38.6	275	39.0	272	**38.8**	**274**
465.tonto	281	35.0	**280**	**35.2**	279	35.2	237	41.6	237	41.6	**237**	**41.6**
470.lbm	18.3	752	**17.6**	**781**	17.3	794	18.3	752	**17.6**	**781**	17.3	794
481.wrf	105	107	106	106	**105**	**106**	105	107	106	106	**105**	**106**
482.sphinx3	**298**	**65.3**	297	65.5	299	65.2	301	64.9	**300**	**65.1**	299	65.2

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 setting:
Operating Mode set to "Efficiency-Favor Performance"
Sysinfo program /home/SPEC/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
running on x3650m5 Wed Mar 18 15:24:09 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
```

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CPU2006 license: 9017
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Tested by: Lenovo Group Limited

Test date: Mar-2015
Hardware Availability: Oct-2014
Software Availability: Sep-2014

Platform Notes (Continued)

```
From /proc/cpuinfo
   model name : Intel(R) Xeon(R) CPU E5-2658 v3 @ 2.20GHz
      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 : 30720 KB

From /proc/meminfo
   MemTotal:      263450988 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 x3650m5 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-home xfs    877G  7.0G  870G   1% /home
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
   hardware, firmware, and the "DMTF SMBIOS" standard.

   BIOS IBM -[TCE103EUS-1.01]- 10/21/2014
   Memory:
   16x Hynix 484D4134324752374D4652344E2D54465431 16 GB 2 rank 2133 MHz
   8x NO DIMM Unknown
```

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Platform Notes (Continued)

```
(End of data from sysinfo program)
```

General Notes

```
Environment variables set by runspec before the start of the run:
KMP_AFFINITY = "granularity=fine,compact,1,0"
LD_LIBRARY_PATH = "/home/SPEC/libs/32:/home/SPEC/libs/64:/home/SPEC/sh"
OMP_NUM_THREADS = "24"

 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
```

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
```

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Software Availability: Sep-2014

Base Portability Flags (Continued)

482.sphinx3: -DSPEC_CPU_LP64

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

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Test date: Mar-2015
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Software Availability: Sep-2014

Peak Optimization Flags (Continued)

```
       470.lbm: basepeak = yes

    482.sphinx3: -xCORE-AVX2 -ipo -O3 -no-prec-div -unroll2 -ansi-alias
                 -parallel
```

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
```

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Peak Optimization Flags (Continued)

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-ic15.0-official-linux64.html
http://www.spec.org/cpu2006/flags/IBM-Platform-Flags-V1.2-HSW-B.html

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/IBM-Platform-Flags-V1.2-HSW-B.xml

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

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