



SPEC[®] CFP2006 Result

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Lenovo Group Limited

SPECfp[®]2006 = 127

Lenovo System x3650 M5
(2.20 GHz, Intel Xeon E5-2699R v4)

SPECfp_base2006 = 121

CPU2006 license: 9017

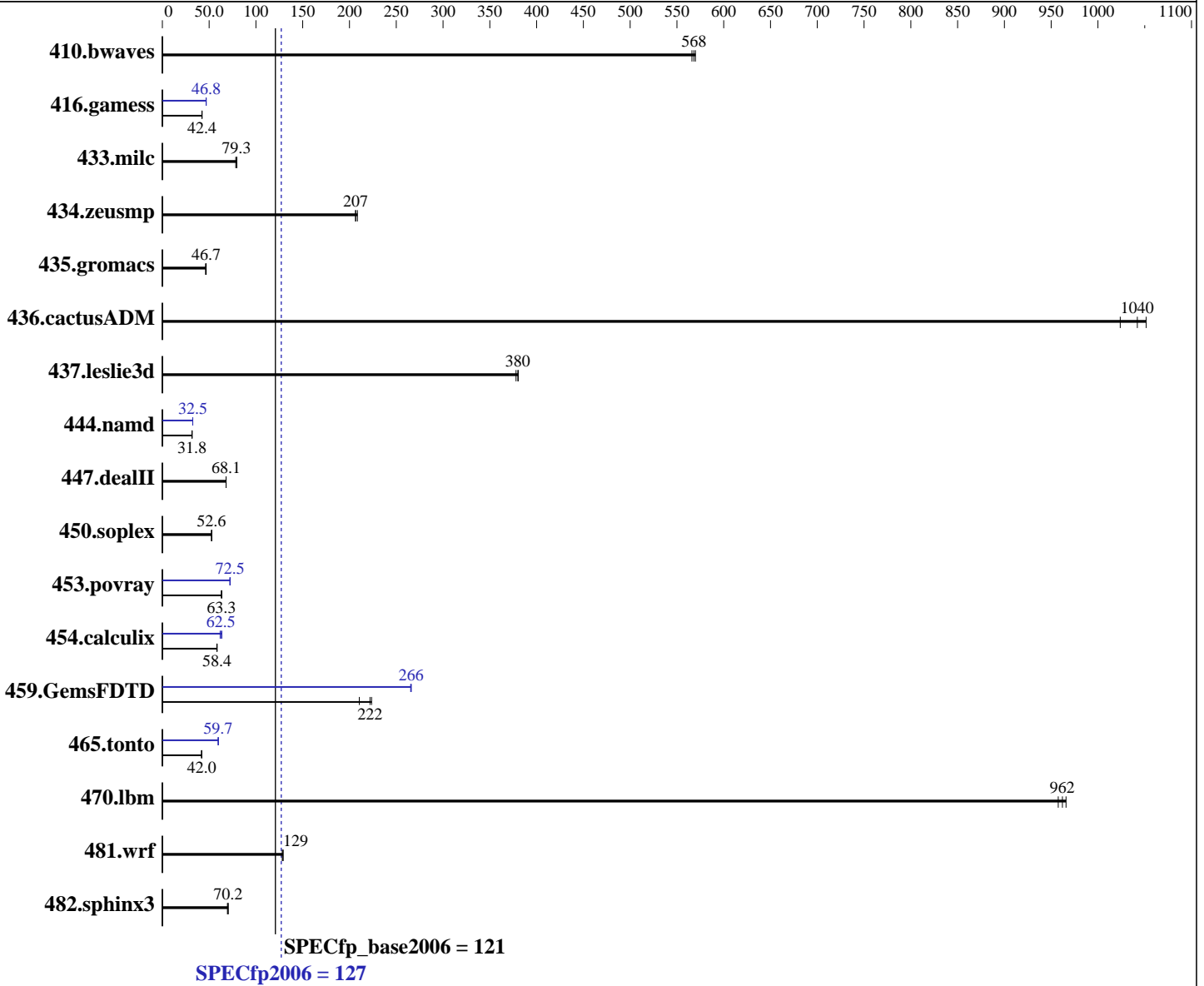
Test date: Dec-2016

Test sponsor: Lenovo Group Limited

Hardware Availability: Jan-2017

Tested by: Lenovo Group Limited

Software Availability: Sep-2016



Hardware	
CPU Name:	Intel Xeon E5-2699R v4
CPU Characteristics:	Intel Turbo Boost Technology up to 3.60 GHz
CPU MHz:	2200
FPU:	Integrated
CPU(s) enabled:	44 cores, 2 chips, 22 cores/chip
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

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Software	
Operating System:	SUSE Linux Enterprise Server 12 SP1 (x86_64) Kernel 3.12.49-11-default
Compiler:	C/C++: Version 17.0.0.098 of Intel C/C++ Compiler for Linux; Fortran: Version 17.0.0.098 of Intel Fortran Compiler for Linux
Auto Parallel:	Yes
File System:	xfs
System State:	Run level 3 (multi-user)

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L3 Cache: 55 MB I+D on chip per chip
Other Cache: None
Memory: 256 GB (16 x 16 GB 2Rx4 PC4-2400T-R)
Disk Subsystem: 1 x 800 GB SATA SSD
Other Hardware: None

Base Pointers: 64-bit
Peak Pointers: 32/64-bit
Other Software: None

Results Table

Benchmark	Base						Peak					
	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	24.0	566	23.9	570	<u>23.9</u>	<u>568</u>	24.0	566	23.9	570	<u>23.9</u>	<u>568</u>
416.gamess	<u>462</u>	<u>42.4</u>	462	42.4	462	42.4	419	46.8	418	46.8	<u>418</u>	<u>46.8</u>
433.milc	117	78.4	115	79.6	<u>116</u>	<u>79.3</u>	117	78.4	115	79.6	<u>116</u>	<u>79.3</u>
434.zeusmp	44.1	206	<u>44.0</u>	<u>207</u>	43.6	208	44.1	206	<u>44.0</u>	<u>207</u>	43.6	208
435.gromacs	<u>153</u>	<u>46.7</u>	152	46.8	155	46.1	<u>153</u>	<u>46.7</u>	152	46.8	155	46.1
436.cactusADM	<u>11.5</u>	<u>1040</u>	11.7	1020	11.4	1050	<u>11.5</u>	<u>1040</u>	11.7	1020	11.4	1050
437.leslie3d	24.7	380	<u>24.7</u>	<u>380</u>	24.9	378	24.7	380	<u>24.7</u>	<u>380</u>	24.9	378
444.namd	254	31.6	252	31.8	<u>252</u>	<u>31.8</u>	<u>247</u>	<u>32.5</u>	247	32.5	247	32.5
447.dealII	<u>168</u>	<u>68.1</u>	168	68.1	168	68.1	<u>168</u>	<u>68.1</u>	168	68.1	168	68.1
450.soplex	159	52.5	<u>159</u>	<u>52.6</u>	158	52.9	159	52.5	<u>159</u>	<u>52.6</u>	158	52.9
453.povray	83.6	63.6	<u>84.1</u>	<u>63.3</u>	84.4	63.0	73.8	72.1	<u>73.4</u>	<u>72.5</u>	73.3	72.6
454.calculix	141	58.5	<u>141</u>	<u>58.4</u>	142	58.2	<u>132</u>	<u>62.5</u>	134	61.7	130	63.6
459.GemsFDTD	<u>47.8</u>	<u>222</u>	50.4	210	47.4	224	<u>39.9</u>	<u>266</u>	40.0	265	39.9	266
465.tonto	235	41.9	<u>234</u>	<u>42.0</u>	234	42.1	<u>165</u>	<u>59.7</u>	165	59.7	164	59.9
470.lbm	<u>14.3</u>	<u>962</u>	14.3	958	14.2	966	<u>14.3</u>	<u>962</u>	14.3	958	14.2	966
481.wrf	87.2	128	86.6	129	<u>86.6</u>	<u>129</u>	87.2	128	86.6	129	<u>86.6</u>	<u>129</u>
482.sphinx3	277	70.4	<u>278</u>	<u>70.2</u>	280	69.5	277	70.4	<u>278</u>	<u>70.2</u>	280	69.5

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"
Transparent Huge Pages disabled with:
echo never > /sys/kernel/mm/transparent_hugepage/enabled

Platform Notes

BIOS configuration:
Operating Mode set to Maximum Performance
Hyper-Threading set to Disable
Sysinfo program /home/cpu2006-1.2-ic17.0/config/sysinfo.rev6993
Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
running on XinYi-MLK-06 Thu Dec 22 14:24:57 2016

This section contains SUT (System Under Test) info as seen by
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Platform Notes (Continued)

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 E5-2699R v4 @ 2.20GHz
 2 "physical id"s (chips)
 44 "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      : 22
siblings       : 22
physical 0:    cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27
                28
physical 1:    cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27
                28
cache size     : 56320 KB

```

From /proc/meminfo

```

MemTotal:      263958180 kB
HugePages_Total: 0
Hugepagesize:  2048 kB

```

From /etc/*release* /etc/*version*

```

SuSE-release:
SUSE Linux Enterprise Server 12 (x86_64)
VERSION = 12
PATCHLEVEL = 1
# This file is deprecated and will be removed in a future service pack or
release.
# Please check /etc/os-release for details about this release.
os-release:
NAME="SLES"
VERSION="12-SP1"
VERSION_ID="12.1"
PRETTY_NAME="SUSE Linux Enterprise Server 12 SP1"
ID="sles"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:12:sp1"

```

uname -a:

```

Linux XinYi-MLK-06 3.12.49-11-default #1 SMP Wed Nov 11 20:52:43 UTC 2015
(8d714a0) x86_64 x86_64 x86_64 GNU/Linux

```

run-level 3 Dec 22 09:43

SPEC is set to: /home/cpu2006-1.2-ic17.0

```

Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sda4       xfs   690G  101G  590G  15% /home

```

Additional information from dmidecode:

Warning: Use caution when you interpret this section. The 'dmidecode' program
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Platform Notes (Continued)

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 LENOVO -[TCE1250-2.20]- 09/07/2016

Memory:

8x NO DIMM Unknown

16x Samsung M393A2G40DB1-CRC 16 GB 2 rank 2400 MHz

(End of data from sysinfo program)

General Notes

Environment variables set by runspec before the start of the run:

KMP_AFFINITY = "granularity=fine,compact"

LD_LIBRARY_PATH = "/home/cpu2006-1.2-ic17.0/libs/32:/home/cpu2006-1.2-ic17.0/libs/64:/home/cpu2006-1.2-ic17.0/sh10.2"

OMP_NUM_THREADS = "44"

Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM
memory using Redhat Enterprise Linux 7.2

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

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Base Portability Flags (Continued)

```

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 -parallel -qopt-prefetch

C++ benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch

Fortran benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -qopt-prefetch

Benchmarks using both Fortran and C:
-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -qopt-prefetch

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



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Peak Optimization Flags

C benchmarks:

433.milc: basepeak = yes

470.lbm: basepeak = yes

482.sphinx3: basepeak = yes

C++ benchmarks:

444.namd: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -fno-alias -auto-ilp32

447.dealII: basepeak = yes

450.soplex: basepeak = yes

453.povray: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -unroll4 -ansi-alias

Fortran benchmarks:

410.bwaves: basepeak = yes

416.gamess: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -unroll2 -inline-level=0 -scalar-rep-

434.zeusmp: basepeak = yes

437.leslie3d: basepeak = yes

459.GemsFDTD: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -unroll2 -inline-level=0
-qopt-prefetch -parallel

465.tonto: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -inline-calloc -qopt-malloc-options=3
-auto -unroll4

Benchmarks using both Fortran and C:

435.gromacs: basepeak = yes

436.cactusADM: basepeak = yes

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Peak Optimization Flags (Continued)

454.calculix: -xCORE-AVX2 -ipo -O3 -no-prec-div -auto-ilp32

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-ic17.0-official-linux64.html>

<http://www.spec.org/cpu2006/flags/Lenovo-Platform-Flags-V1.2-BDW-C.html>

You can also download the XML flags sources by saving the following links:

<http://www.spec.org/cpu2006/flags/Intel-ic17.0-official-linux64.xml>

<http://www.spec.org/cpu2006/flags/Lenovo-Platform-Flags-V1.2-BDW-C.xml>

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Tested with SPEC CPU2006 v1.2.

Report generated on Tue Feb 7 17:00:45 2017 by SPEC CPU2006 PS/PDF formatter v6932.

Originally published on 7 February 2017.