**Lenovo Group Limited**

Lenovo System x3650 M5  
(2.10 GHz, Intel Xeon E5-2683 v4)

<table>
<thead>
<tr>
<th>SPECfp®2006</th>
<th>SPECfp_base2006</th>
</tr>
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<tbody>
<tr>
<td>116</td>
<td>110</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>CPU2006 license:</th>
<th>9017</th>
</tr>
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<tbody>
<tr>
<td>Test sponsor:</td>
<td>Lenovo Group Limited</td>
</tr>
<tr>
<td>Tested by:</td>
<td>Lenovo Group Limited</td>
</tr>
<tr>
<td>Test date:</td>
<td>Apr-2016</td>
</tr>
<tr>
<td>Hardware Availability:</td>
<td>Mar-2016</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Dec-2015</td>
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<table>
<thead>
<tr>
<th><strong>Hardware</strong></th>
<th><strong>Software</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name:</td>
<td>Operating System:</td>
</tr>
<tr>
<td></td>
<td>SUSE Linux Enterprise Server 12 SP1 (x86_64)</td>
</tr>
<tr>
<td>CPU Characteristics:</td>
<td>Kernel 3.12.49-11-default</td>
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<tr>
<td>CPU MHZ:</td>
<td>Compiler:</td>
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<tr>
<td></td>
<td>C/C++: Version 16.0.0.101 of Intel C++ Studio XE for Linux; Fortran: Version 16.0.0.101 of Intel Fortran Studio XE for Linux</td>
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<tr>
<td>FPU:</td>
<td>Auto Parallel:</td>
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<tr>
<td>CPU(s) enabled:</td>
<td>File System:</td>
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<td>CPU(s) orderable:</td>
<td>System State:</td>
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<tr>
<td></td>
<td>Run level 3 (multi-user)</td>
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<tr>
<td>Primary Cache:</td>
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</tr>
<tr>
<td></td>
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<tr>
<td>Secondary Cache:</td>
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Lenovo Group Limited

Lenovo System x3650 M5
(2.10 GHz, Intel Xeon E5-2683 v4)

CPU2006 license: 9017
Test sponsor: Lenovo Group Limited
Tested by: Lenovo Group Limited

L3 Cache: 40 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

SPEC CFP2006 Result

SPECfp2006 = 116
SPECfp_base2006 = 110

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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<tbody>
<tr>
<td>410.bwaves</td>
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<td>18.7</td>
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<td><strong>45.3</strong></td>
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<td>459.GemsFDTD</td>
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<td>465.tonto</td>
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<td><strong>14.6</strong></td>
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<tr>
<td>481.wrf</td>
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<td>482.sphinx3</td>
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<td><strong>296</strong></td>
<td><strong>65.9</strong></td>
<td>299</td>
<td>65.1</td>
</tr>
</tbody>
</table>

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 Disabled
COD Preference set to Disable
Sysinfo program /home/cpu2006-1.2-ic16.0/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
running on XinYi-mlk-04-sles12sp1 Wed Apr 6 14:29:22 2016

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Lenovo Group Limited
Lenovo System x3650 M5
(2.10 GHz, Intel Xeon E5-2683 v4)

CPU2006 license: 9017
Test sponsor: Lenovo Group Limited
Tested by: Lenovo Group Limited

SPECfp2006 = 116
SPECfp_base2006 = 110

Platform Notes (Continued)

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 E5-2683 v4 @ 2.10GHz
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 : 16
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 : 40960 KB

From /proc/meminfo
MemTotal: 263959860 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-04-sles12sp1 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 Apr 6 09:00

SPEC is set to: /home/cpu2006-1.2-ic16.0
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda4 xfs 701G 11G 691G 2% /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
Lenovo Group Limited

Lenovo System x3650 M5
(2.10 GHz, Intel Xeon E5-2683 v4)

SPECfp2006 = 116
SPECfp_base2006 = 110

CPU2006 license: 9017
Test sponsor: Lenovo Group Limited
Tested by: Lenovo Group Limited

Platform Notes (Continued)

determined", but the intent may not be met, as there are frequent changes to
hardware, firmware, and the "DMTF SMBIOS" standard.

BIOS LENOVO –[TCE123H-2.10]– 03/25/2016
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-ic16.0/libs/32:/home/cpu2006-1.2-ic16.0/libs/64:/home/cpu2006-1.2-ic16.0/sh"
OMP_NUM_THREADS = "32"

Binaries compiled on a system with 1x Intel Core i5-4670K CPU + 32GB memory using RedHat EL 7.1

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

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Lenovo Group Limited

Lenovo System x3650 M5
(2.10 GHz, Intel Xeon E5-2683 v4)

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<tr>
<td>SPECfp_base2006 =</td>
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CPU2006 license: 9017
Test sponsor: Lenovo Group Limited
Tested by: Lenovo Group Limited
Test date: Apr-2016
Hardware Availability: Mar-2016
Software Availability: Dec-2015

**Base Portability Flags (Continued)**

- 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 -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
Lenovo Group Limited

Lenovo System x3650 M5
(2.10 GHz, Intel Xeon E5-2683 v4)

SPECfp2006 = 116
SPECfp_base2006 = 110

CPU2006 license: 9017  Test date:  Apr-2016
Test sponsor:  Lenovo Group Limited  Hardware Availability:  Mar-2016
Tested by:  Lenovo Group Limited  Software Availability:  Dec-2015

Peak Optimization Flags

C benchmarks:

433.milc: basepeak = yes
470.lbm: basepeak = yes
482.sphinx3: basepeak = yes

C++ benchmarks:

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

447.dealII: basepeak = yes
450.soplex: basepeak = yes
453.povray: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)
           -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)
           -par-num-threads=1(pass 1) -prof-use(pass 2) -unroll4
           -ansi-alias

Fortran benchmarks:

410.bwaves: basepeak = yes
416.gamess: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)
           -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)
           -par-num-threads=1(pass 1) -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:threadsafe(pass 1)
               -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)
               -par-num-threads=1(pass 1) -prof-use(pass 2) -unroll2
               -inline-level=0 -opt-prefetch -parallel

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

Benchmarks using both Fortran and C:

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Lenovo Group Limited
Lenovo System x3650 M5 (2.10 GHz, Intel Xeon E5-2683 v4)

SPECfp2006 = 116
SPECfp_base2006 = 110

CPU2006 license: 9017
Test sponsor: Lenovo Group Limited
Tested by: Lenovo Group Limited
Test date: Apr-2016
Hardware Availability: Mar-2016
Tested with SPEC CPU2006 v1.2.

Peak Optimization Flags (Continued)

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-ic16.0-official-linux64.html
http://www.spec.org/cpu2006/flags/Lenovo-Platform-Flags-V1.2-BDW-B.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/Intel-ic16.0-official-linux64.xml
http://www.spec.org/cpu2006/flags/Lenovo-Platform-Flags-V1.2-BDW-B.xml

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