Lenovo Group Limited

Lenovo Flex System x240 M5
(2.30 GHz, Intel Xeon E5-2697 v4)

SPECfp®2006 = 126
SPECfp_base2006 = 118

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

Hardware
CPU Name: Intel Xeon E5-2697 v4
CPU Characteristics: Intel Turbo Boost Technology up to 3.60 GHz
CPU MHz: 2300
FPU: Integrated
CPU(s) enabled: 36 cores, 2 chips, 18 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

Software
Operating System: SUSE Linux Enterprise Server 12 SP1 (x86_64)
Kernel 3.12.49-11-default
Compiler: 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
Auto Parallel: Yes
File System: xfs
System State: Run level 3 (multi-user)
## Lenovo Group Limited

**Lenovo Flex System x240 M5**  
*(2.30 GHz, Intel Xeon E5-2697 v4)*

<table>
<thead>
<tr>
<th>CPU2006 license:</th>
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<tr>
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<td>Lenovo Group Limited</td>
</tr>
</tbody>
</table>

- **L3 Cache:** 45 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

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<td>68.5</td>
<td>284</td>
<td>68.6</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"

### 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 #e3fb8667b5a285932ceab81e28219e1`  
  - running on Bonnevil-02 Wed May 25 20:06:10 2016

This section contains SUT (System Under Test) info as seen by some common utilities. To remove or add to this section, see:

Continued on next page
Lenovo Flex System x240 M5
(2.30 GHz, Intel Xeon E5-2697 v4)

**SPECfp2006 =** 126
**SPECfp_base2006 =** 118

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

**Platform Notes (Continued)**

http://www.spec.org/cpu2006/Docs/config.html#sysinfo

From /proc/cpuinfo

- model name : Intel(R) Xeon(R) CPU E5-2697 v4 @ 2.30GHz
- 2 "physical id"s (chips)
- 36 "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 : 18
  - siblings : 18
  - physical 0: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
  - physical 1: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
- cache size : 46080 KB

From /proc/meminfo

- MemTotal: 263828476 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:

```
(8d714a0) x86_64 x86_64 x86_64 GNU/Linux
```

run-level 3 May 25 15:18

SPEC is set to: /home/cpu2006-1.2-ic16.0

Filesystem Type Size Used Avail Use% Mounted on
/dev/sda4 xfs 688G 42G 647G 6% /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.

Continued on next page
SPEC CFP2006 Result

Lenovo Group Limited

Lenovo Flex System x240 M5
(2.30 GHz, Intel Xeon E5-2697 v4)

SPECfp2006 = 126
SPECfp_base2006 = 118

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

Platform Notes (Continued)

BIOS LENOVO -[C4E124J-2.10]- 05/05/2016
Memory:
  16x Hynix HMA42GR7AFR4N-UH 16 GB 2 rank 2400 MHz
  8x NO DIMM Unknown

(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 = "36"

Binaries compiled on a system with 1x Intel Core i5-4670K CPU + 32GB memory using RedHat EL 7.1
Transparent Huge Pages disabled with:
echo never > /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
  -DSPEC_CPU_LP64
433.milc: -DSPEC_CPU_LP64
434.zeusmp: -DSPEC_CPU_LP64
  -DSPEC_CPU_LP64
435.gromacs: -DSPEC_CPU_LP64
  -DSPEC_CPU_LP64
436.cactusADM: -DSPEC_CPU_LP64
  -nofor_main
437.leslie3d: -DSPEC_CPU_LP64
444.namd: -DSPEC_CPU_LP64
  -DSPEC_CPU_LP64
447.dealII: -DSPEC_CPU_LP64
450.soplex: -DSPEC_CPU_LP64

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Lenovo Group Limited

Lenovo Flex System x240 M5
(2.30 GHz, Intel Xeon E5-2697 v4)

SPECfp2006 = 126
SPECfp_base2006 = 118

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

Test date: May-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
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-llp32
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:

Continued on next page
**Lenovo Group Limited**

Lenovo Flex System x240 M5  
(2.30 GHz, Intel Xeon E5-2697 v4)

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

### 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


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

- [http://www.spec.org/cpu2006/flags/Lenovo-Platform-Settings-V1.2-BDW-revC.xml](http://www.spec.org/cpu2006/flags/Lenovo-Platform-Settings-V1.2-BDW-revC.xml)

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For other inquiries, please contact webmaster@spec.org.

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