Lenovo Group Limited

Lenovo System x3500 M4
(Intel Xeon E5-2640 v2, 2.00 GHz)

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

SPECfp®2006 = 78.0
SPECfp_base2006 = 75.0

Critical Path:

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<thead>
<tr>
<th>Test</th>
<th>SPECfp2006</th>
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<tr>
<td>410.bwaves</td>
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<td>481.wrf</td>
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<tr>
<td>482.sphinx3</td>
<td>497</td>
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</tr>
</tbody>
</table>

Hardware

CPU Name: Intel Xeon E5-2640 v2
CPU Characteristics: Intel Turbo Boost Technology up to 2.50 GHz
CPU MHz: 2000
FPU: Integrated
CPU(s) enabled: 16 cores, 2 chips, 8 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

Software

Operating System: Red Hat Enterprise Linux Server release 6.4 (Santiago)
Compiler: C/C++: Version 14.0.0.080 of Intel C++ Studio XE for Linux;
Fortran: Version 14.0.0.080 of Intel Fortran Studio XE for Linux
Auto Parallel: Yes
File System: ext4

Test date: Feb-2015
Hardware Availability: Dec-2013
Software Availability: Sep-2013

Continued on next page
**Lenovo Group Limited**

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(Intel Xeon E5-2640 v2, 2.00 GHz)

**CPU2006 license:** 9017  
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**L3 Cache:** 20 MB I+D on chip per chip  
**Other Cache:** None  
**Memory:** 256 GB (16 x 16 GB 2Rx4 PC3-14900R-13, ECC, running at 1600 MHz)

**Disk Subsystem:** 1 x 1 TB SATA, 7200 RPM  
**Other Hardware:** None

**System State:** Run level 3 (multi-user)  
**Base Pointers:** 64-bit  
**Peak Pointers:** 32/64-bit  
**Other Software:** None

**SPEC CFP2006 Result**  
**SPECfp2006 = 78.0**  
**SPECfp_base2006 = 75.0**

---

**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>56.1</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"  
Zone reclaim mode enabled with:  
echo 1 > /proc/sys/vm/zone_reclaim_mode  
Intel Idle Driver disabled with the following Linux kernel parameter in /etc/grub.conf:  
intel_idle.max_cstate=0

---

**Platform Notes**

BIOS setting:  
Operating Mode set to Maximum Performance  
Sysinfo program /home/SPECCpu-20140116-ic14.0/config/sysinfo.rev6874  
$Rev: 6874 $ $Date:: 2013-11-20 #$ 654bd3fcf53b06faef0efe54ed011998  
running on x3500M4 Fri Feb 27 19:21:01 2015

Continued on next page
Lenovo Group Limited

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CPU2006 license: 9017
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Test date: Feb-2015
Hardware Availability: Dec-2013
Software Availability: Sep-2013

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 E5-2640 v2 @ 2.00GHz
 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 : 8
siblings : 16
physical 0: cores 0 1 2 3 4 5 6 7
physical 1: cores 0 1 2 3 4 5 6 7
cache size : 20480 KB

From /proc/meminfo
MemTotal: 264654436 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /usr/bin/lsb_release -d
Red Hat Enterprise Linux Server release 6.4 (Santiago)

From /etc/*release*/etc/*version*
redhat-release: Red Hat Enterprise Linux Server release 6.4 (Santiago)
system-release: Red Hat Enterprise Linux Server release 6.4 (Santiago)

uname -a:
Linux x3500M4 2.6.32-358.el6.x86_64 #1 SMP Tue Jan 29 11:47:41 EST 2013
x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Feb 27 19:15

SPEC is set to: /home/SPECcpu-20140116-ic14.0
Filesystem Type Size Used Avail Use% Mounted on
/dev/mapper/vg_intelcrb-lv_home
  ext4 863G 41G 779G 5% /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 -[Y5E139ZUS-1.70]- 06/25/2014
Memory:
  8x Not Specified Not Specified
  16x Samsung M393B2G70QH0-CMA 16 GB 2 rank 1866 MHz, configured at 1600 MHz

Continued on next page
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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/SPECcpu-20140116-ic14.0/libs/32:/home/SPECcpu-20140116-ic14.0/libs/64:/home/SPECcpu-20140116-ic14.0/sh"
OMP_NUM_THREADS = "16"

Binaries compiled on a system with 1x Core i7-860 CPU + 8GB memory using RedHat EL 6.4
Transparent Huge Pages enabled with:
echo always > /sys/kernel/mm/redhat_transparent_hugepage/enabled
runspec command invoked through numactl i.e.:
umactl --interleave=all runspec <etc>

Base Compiler Invocation

C benchmarks:
  icc   -m64

C++ benchmarks:
  icpc  -m64

Fortran benchmarks:
  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

Continued on next page
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SPECFp2006 = 78.0
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Base Portability Flags (Continued)

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:
- xAVX -ipo -03 -no-prec-div -parallel -opt-prefetch -ansi-alias

C++ benchmarks:
- xAVX -ipo -03 -no-prec-div -opt-prefetch -ansi-alias

Fortran benchmarks:
- xAVX -ipo -03 -no-prec-div -parallel -opt-prefetch

Benchmarks using both Fortran and C:
- xAVX -ipo -03 -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:

Continued on next page
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Peak Optimization Flags (Continued)

433.milc: -xAVX(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

470.lbm: basepeak = yes

482.sphinx3: -xAVX -ipo -O3 -no-prec-div -unroll2 -ansi-alias
    -parallel

C++ benchmarks:

444.namd: -xAVX(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: -xAVX(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: -xAVX(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: -xAVX(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: -xAVX(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: -xAVX -ipo -O3 -no-prec-div -auto-ilp32 -ansi-alias

Continued on next page
## Lenovo Group Limited

### Lenovo System x3500 M4

(Intel Xeon E5-2640 v2, 2.00 GHz)

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
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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/IBM-Platform-Flags-V1.2-IVB-C.html](http://www.spec.org/cpu2006/flags/IBM-Platform-Flags-V1.2-IVB-C.html)

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

- [http://www.spec.org/cpu2006/flags/IBM-Platform-Flags-V1.2-IVB-C.xml](http://www.spec.org/cpu2006/flags/IBM-Platform-Flags-V1.2-IVB-C.xml)

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

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