Lenovo Group Limited

Lenovo System x iDataPlex dx360 M4 (Intel Xeon E5-2637 v2, 3.50 GHz)

SPECfp®2006 = 98.8
SPECfp_base2006 = 95.3

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

Test date: Dec-2014
Hardware Availability: Dec-2013
Software Availability: Sep-2013

**Hardware**

<table>
<thead>
<tr>
<th>Benchmark</th>
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<tbody>
<tr>
<td>410.bwaves</td>
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**Hardware**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
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<tbody>
<tr>
<td>CPU Name</td>
<td>Intel Xeon E5-2637 v2</td>
</tr>
<tr>
<td>CPU Characteristics</td>
<td>Intel Turbo Boost Technology up to 3.80 GHz</td>
</tr>
<tr>
<td>CPU MHZ</td>
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</tr>
<tr>
<td>FPU</td>
<td>Integrated</td>
</tr>
<tr>
<td>CPU(s) enabled</td>
<td>8 cores, 2 chips, 4 cores/chip</td>
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<tr>
<td>CPU(s) orderable</td>
<td>1.2 chips</td>
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<tr>
<td>Primary Cache</td>
<td>32 KB I + 32 KB D on chip per core</td>
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<tr>
<td>Secondary Cache</td>
<td>256 KB I+D on chip per core</td>
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**Software**

<table>
<thead>
<tr>
<th>Feature</th>
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<tbody>
<tr>
<td>Operating System</td>
<td>Red Hat Enterprise Linux Server release 6.4 (Santiago)</td>
</tr>
<tr>
<td>Compiler</td>
<td>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</td>
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<tr>
<td>Auto Parallel</td>
<td>Yes</td>
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<tr>
<td>File System</td>
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*Continued on next page*
## Lenovo Group Limited

**Lenovo System x iDataPlex dx360 M4**  
(Intel Xeon E5-2637 v2, 3.50 GHz)

<table>
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</tr>
<tr>
<td>Tested by: IBM Corporation</td>
<td>Software Availability: Sep-2013</td>
</tr>
</tbody>
</table>

**L3 Cache:** 15 MB I+D on chip per chip  
**Other Cache:** None  
**Memory:** 256 GB (16 x 16 GB 2Rx4 PC3-14900R-13, ECC)  
**Disk Subsystem:** 1 x 500 GB 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

### Results Table

<table>
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<tr>
<th>Benchmark</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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</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  
Hyper-Threading set to Disable  
Sysinfo program /home/SPECcpu-20140116-ic14.0/config/sysinfo.rev6874  
$Rev: 6874 $ $Date:: 2013-11-20 #$ 654bd3fcf53b06faef0efe54ed011998  
running on dx360M4 Thu Dec 4 09:35:51 2014

Continued on next page
**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](http://www.spec.org/cpu2006/Docs/config.html#sysinfo)

From `/proc/cpuinfo`

- model name: Intel(R) Xeon(R) CPU E5-2637 v2 @ 3.50GHz
- 2 "physical id"s (chips)
- 8 "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: 4
  - siblings: 4
  - physical 0: cores 1 2 3 4
  - physical 1: cores 1 2 3 4
- cache size: 15360 KB

From `/proc/meminfo`

- MemTotal: 264644468 kB
- HugePages_Total: 0
- Hugepagesize: 2048 kB

```
/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 dx360M4 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 Dec 3 17:54
```

SPEC is set to: `/home/SPECcpu-20140116-ic14.0`

```
Filesystem Type Size Used Avail Use% Mounted on
/dev mapper/vg_td2-1v_home
    ext4 380G 174G 178G 49% /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 -[TDE139OUS-1.50]- 02/21/2014
Memory:
```

- 16x Samsung M393B2G70QH0-CMA 16 GB 2 rank 1866 MHz, configured at 1867 MHz
Lenovo Group Limited

Lenovo System x iDataPlex dx360 M4
(Intel Xeon E5-2637 v2, 3.50 GHz)

CPU2006 license: 9017  
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Test date: Dec-2014  
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SPECfp2006 = 98.8  
SPECfp_base2006 = 95.3

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,0,1"
- 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 = "8"

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

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

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Base Portability Flags (Continued)

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 -O3 -no-prec-div -parallel -opt-prefetch -ansi-alias

C++ benchmarks:
- xAVX -ipo -O3 -no-prec-div -opt-prefetch -ansi-alias

Fortran benchmarks:
- xAVX -ipo -O3 -no-prec-div -parallel -opt-prefetch

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

Continued on next page
Lenovo Group Limited
Lenovo System x iDataPlex dx360 M4
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Test sponsor: Lenovo Group Limited
Hardware Availability: Dec-2013
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Peak Optimization Flags (Continued)

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

481.wrf: basepeak = yes
Lenovo Group Limited

Lenovo System x iDataPlex dx360 M4
(Intel Xeon E5-2637 v2, 3.50 GHz)

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The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2006/flags/Intel-ic14.0-official-linux64.20140128.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/Intel-ic14.0-official-linux64.20140128.xml
http://www.spec.org/cpu2006/flags/IBM-Platform-Flags-V1.2-IVB-C.xml

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

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