# SPEC® CINT2006 Result

## Lenovo Group Limited

IBM System x iDataPlex dx360 M4
(Intel Xeon E5-2648L v2, 1.90 GHz)

<table>
<thead>
<tr>
<th>SPECint_rate2006</th>
<th>622</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECint_rate_base2006</td>
<td>599</td>
</tr>
</tbody>
</table>

**CPU2006 license:** 9017

**Test sponsor:** Lenovo Group Limited

**Tested by:** IBM Corporation

**Test date:** Oct-2014

**Hardware Availability:** Dec-2013

**Software Availability:** Sep-2013

### Hardware

<table>
<thead>
<tr>
<th>CPU Name</th>
<th>Intel Xeon E5-2648L v2</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Characteristics</td>
<td>Intel Turbo Boost Technology up to 2.50 GHz</td>
</tr>
<tr>
<td>CPU MHz</td>
<td>1900</td>
</tr>
<tr>
<td>FPU</td>
<td>Integrated</td>
</tr>
<tr>
<td>CPU(s) enabled</td>
<td>20 cores, 2 chips, 10 cores/chip, 2 threads/core</td>
</tr>
<tr>
<td>CPU(s) orderable</td>
<td>1.2 chips</td>
</tr>
<tr>
<td>Primary Cache</td>
<td>32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td>Secondary Cache</td>
<td>256 KB I+D on chip per core</td>
</tr>
<tr>
<td>L3 Cache</td>
<td>25 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other Cache</td>
<td>None</td>
</tr>
<tr>
<td>Memory</td>
<td>256 GB (16 x 16 GB 2Rx4 PC3-14900R-13, ECC)</td>
</tr>
<tr>
<td>Disk Subsystem</td>
<td>1 x 500 GB SATA, 7200 RPM</td>
</tr>
<tr>
<td>Other Hardware</td>
<td>None</td>
</tr>
</tbody>
</table>

### Software

<table>
<thead>
<tr>
<th>Operating System</th>
<th>Red Hat Enterprise Linux Server release 6.4 (Santiago)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compiler</td>
<td>C++: Version 14.0.0.080 of Intel C++ Studio XE for Linux</td>
</tr>
<tr>
<td>Auto Parallel</td>
<td>No</td>
</tr>
<tr>
<td>File System</td>
<td>ext4</td>
</tr>
<tr>
<td>System State</td>
<td>Run level 3 (multi-user)</td>
</tr>
<tr>
<td>Base Pointers</td>
<td>32-bit</td>
</tr>
<tr>
<td>Peak Pointers</td>
<td>32/64-bit</td>
</tr>
<tr>
<td>Other Software</td>
<td>Microquill SmartHeap V10.0</td>
</tr>
</tbody>
</table>
**Lenovo Group Limited**

IBM System x iDataPlex dx360 M4
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SPECint_rate2006 = 622
SPECint_rate_base2006 = 599

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

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### Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>400.perlbench</td>
<td>40</td>
<td>907</td>
<td>431</td>
<td>903</td>
<td>433</td>
<td>904</td>
<td>432</td>
</tr>
<tr>
<td>401.bzip2</td>
<td>40</td>
<td>1193</td>
<td>324</td>
<td>1191</td>
<td>324</td>
<td>1194</td>
<td>323</td>
</tr>
<tr>
<td>403.gcc</td>
<td>40</td>
<td>377</td>
<td>967</td>
<td>378</td>
<td>966</td>
<td>377</td>
<td>968</td>
</tr>
<tr>
<td>445.gobmk</td>
<td>40</td>
<td>992</td>
<td>423</td>
<td>991</td>
<td>423</td>
<td>992</td>
<td>423</td>
</tr>
<tr>
<td>456.hmmer</td>
<td>40</td>
<td>471</td>
<td>793</td>
<td>471</td>
<td>792</td>
<td>471</td>
<td>792</td>
</tr>
<tr>
<td>458.sjeng</td>
<td>40</td>
<td>1142</td>
<td>3870</td>
<td>214</td>
<td>3860</td>
<td>214</td>
<td>3860</td>
</tr>
<tr>
<td>462.libquantum</td>
<td>40</td>
<td>1228</td>
<td>721</td>
<td>1224</td>
<td>723</td>
<td>1228</td>
<td>721</td>
</tr>
<tr>
<td>471.omnetpp</td>
<td>40</td>
<td>703</td>
<td>356</td>
<td>704</td>
<td>355</td>
<td>704</td>
<td>355</td>
</tr>
<tr>
<td>473.astar</td>
<td>40</td>
<td>803</td>
<td>350</td>
<td>805</td>
<td>350</td>
<td>805</td>
<td>350</td>
</tr>
<tr>
<td>483.xalancbmk</td>
<td>40</td>
<td>415</td>
<td>665</td>
<td>416</td>
<td>664</td>
<td>417</td>
<td>662</td>
</tr>
</tbody>
</table>

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

**Submit Notes**

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl commands to bind each copy to a specific processor. For details, please see the config file.

**Operating System Notes**

Stack size set to unlimited using "ulimit -s unlimited"  
Zone reclaim mode enabled with:  
```bash  
echo 1 > /proc/sys/vm/zone_reclaim_mode  
```

Intel Idle Driver disabled with the following Linux kernel parameter in /etc/grub.conf:  
```bash  
iintel_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 dx360M4 Mon Oct 20 13:54:28 2014

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 E5-2648L v2 @ 1.90GHz  
2 "physical id"s (chips)  
Continued on next page
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SPECint\textsubscript{rate\_base2006} = 599

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

Test date: Oct-2014
Hardware Availability: Dec-2013
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Platform Notes (Continued)

40 "processors"
cores, siblings (Caution: counting these is hw and system dependent. The
following excerpts from /proc/cpuinfo might not be reliable. Use with
cautions.)
cpu cores : 10
siblings : 20
physical 0: cores 0 1 2 3 4 8 9 10 11 12
physical 1: cores 0 1 2 3 4 8 9 10 11 12
cache size : 25600 KB

From /proc/meminfo
MemTotal: 264640496 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)
system\_release\_cpe: cpe:/o:redhat:enterprise\_linux:6\_server:ga:server

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 Oct 20 12:32
SPEC is set to: /home/SPEC\_cpu-20140116-ic14.0

Filesystem Type Size Used Avail Use\% Mounted on
/dev/mapper/vg\_td2-lv\_home
ext4 380G 174G 187G 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

(End of data from sysinfo program)

General Notes

Environment variables set by runspec before the start of the run:
LD\_LIBRARY\_PATH = */home/SPEC\_cpu-20140116-ic14.0/11bs/32:/home/SPEC\_cpu-20140116-ic14.0/11bs/64:/home/SPEC\_cpu-20140116-ic14.0/sh*

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General Notes (Continued)

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
Filesystem page cache cleared with:
  echo 1> /proc/sys/vm/drop_caches
runspec command invoked through numactl i.e.:
  numactl --interleave=all runspec <etc>

Base Compiler Invocation

C benchmarks:
  icc  -m32

C++ benchmarks:
  icpc -m32

Base Portability Flags

  400.perlb淑: -DSPEC_CPU_LINUX_IA32
  462.libquantum: -DSPEC_CPU_LINUX
  483.xalancbmk: -DSPEC_CPU_LINUX

Base Optimization Flags

C benchmarks:
  -xSSE4.2 -ipo -O3 -no-prec-div -opt-prefetch -opt-mem-layout-trans=3

C++ benchmarks:
  -xSSE4.2 -ipo -O3 -no-prec-div -opt-prefetch -opt-mem-layout-trans=3
  -Wl,-z,muldefs -L/sh -lsmartheap

Base Other Flags

C benchmarks:
  403.gcc: -Dalloca=_alloca

Peak Compiler Invocation

C benchmarks (except as noted below):
  icc  -m32

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Peak Compiler Invocation (Continued)

400.perlbench: icc -m64
401.bzip2: icc -m64
456.hmmer: icc -m64
458.sjeng: icc -m64
C++ benchmarks:
   icpc -m32

Peak Portability Flags

400.perlbench: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX_X64
401.bzip2: -DSPEC_CPU_LP64
456.hmmer: -DSPEC_CPU_LP64
458.sjeng: -DSPEC_CPU_LP64
462.libquantum: -DSPEC_CPU_LINUX
483.xalancbmk: -DSPEC_CPU_LINUX

Peak Optimization Flags

C benchmarks:

400.perlbench: -xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2)
   -O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2)
   -auto-ilp32
401.bzip2: -xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2)
   -O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2)
   -opt-prefetch -auto-ilp32 -ansi-alias
403.gcc: basepeak = yes
429.mcf: basepeak = yes
445.gobmk: -xSSE4.2(pass 2) -prof-gen(pass 1) -prof-use(pass 2)
   -ansi-alias -opt-mem-layout-trans=3
456.hmmer: -xSSE4.2 -ipo -O3 -no-prec-div -unroll2 -auto-ilp32
458.sjeng: -xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2)
   -O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2)
   -unroll4 -auto-ilp32

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Peak Optimization Flags (Continued)

462.libquantum: basepeak = yes
464.h264ref: -xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2)
-o3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2)
-unroll2 -ansi-alias

C++ benchmarks:
471.omnetpp: -xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2)
-o3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2)
-ansi-alias -opt-ra-region-strategy=block -L/sh -lsmartheap

473.astar: basepeak = yes
483.xalancbmk: basepeak = yes

Peak Other Flags

C benchmarks:
403.gcc: -Dalloca=_alloca

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 other inquiries, please contact webmaster@spec.org.

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