Lenovo Group Limited
IBM System x iDataPlex dx360 M4
(Intel Xeon E5-2640 v2, 2.00 GHz)

SPEClnt_rate2006 = 541
SPEClnt_rate_base2006 = 521

CPU2006 license: Lenovo Group Limited
Test sponsor: IBM Corporation
Hardware Availability: Oct-2014
Software Availability: Dec-2013

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
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 500 GB SATA, 7200 RPM
Other Hardware: None

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

IBM System x iDataPlex dx360 M4  
(Intel Xeon E5-2640 v2, 2.00 GHz)

**SPEC CINT2006 Result**

<table>
<thead>
<tr>
<th>Test date:</th>
<th>Oct-2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test sponsor:</td>
<td>Lenovo Group Limited</td>
</tr>
<tr>
<td>Tested by:</td>
<td>IBM Corporation</td>
</tr>
</tbody>
</table>

**CPU2006 license:** 9017  
**Test date:** Oct-2014  
**Hardware Availability:** Dec-2013  
**Tested by:** IBM Corporation  
**Software Availability:** Sep-2013

### 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>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>400.perlbench</td>
<td>32</td>
<td>826</td>
<td>378</td>
<td>826</td>
<td>378</td>
<td>830</td>
<td>377</td>
<td>32</td>
<td>684</td>
<td>457</td>
<td>684</td>
</tr>
<tr>
<td>401.bzip2</td>
<td>32</td>
<td>1110</td>
<td>278</td>
<td>1108</td>
<td>279</td>
<td>1109</td>
<td>278</td>
<td>32</td>
<td>1083</td>
<td>285</td>
<td>1084</td>
</tr>
<tr>
<td>403.gcc</td>
<td>32</td>
<td>617</td>
<td>417</td>
<td>614</td>
<td>420</td>
<td>615</td>
<td>419</td>
<td>32</td>
<td>617</td>
<td>417</td>
<td>614</td>
</tr>
<tr>
<td>445.gobmk</td>
<td>32</td>
<td>908</td>
<td>369</td>
<td>906</td>
<td>370</td>
<td>908</td>
<td>370</td>
<td>32</td>
<td>867</td>
<td>387</td>
<td>873</td>
</tr>
<tr>
<td>456.hmmer</td>
<td>32</td>
<td>430</td>
<td>694</td>
<td>360</td>
<td>430</td>
<td>430</td>
<td>430</td>
<td>32</td>
<td>386</td>
<td>773</td>
<td>387</td>
</tr>
<tr>
<td>458.sjeng</td>
<td>32</td>
<td>1029</td>
<td>376</td>
<td>1049</td>
<td>369</td>
<td>1047</td>
<td>370</td>
<td>32</td>
<td>1012</td>
<td>383</td>
<td>990</td>
</tr>
<tr>
<td>462.libquantum</td>
<td>32</td>
<td>196</td>
<td>3380</td>
<td>196</td>
<td>3380</td>
<td>196</td>
<td>3380</td>
<td>32</td>
<td>196</td>
<td>3380</td>
<td>196</td>
</tr>
<tr>
<td>464.h264ref</td>
<td>32</td>
<td>1130</td>
<td>627</td>
<td>1131</td>
<td>626</td>
<td>1128</td>
<td>628</td>
<td>32</td>
<td>1117</td>
<td>634</td>
<td>1117</td>
</tr>
<tr>
<td>471.omnetpp</td>
<td>32</td>
<td>660</td>
<td>303</td>
<td>663</td>
<td>301</td>
<td>661</td>
<td>303</td>
<td>32</td>
<td>622</td>
<td>322</td>
<td>623</td>
</tr>
<tr>
<td>473.astar</td>
<td>32</td>
<td>738</td>
<td>305</td>
<td>741</td>
<td>303</td>
<td>740</td>
<td>303</td>
<td>32</td>
<td>738</td>
<td>305</td>
<td>741</td>
</tr>
<tr>
<td>483.xalancbmk</td>
<td>32</td>
<td>379</td>
<td>582</td>
<td>379</td>
<td>583</td>
<td>379</td>
<td>582</td>
<td>32</td>
<td>379</td>
<td>582</td>
<td>379</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:  
```
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 dx360M4 Wed Oct 8 18:24:56 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 E5-2640 v2 @ 2.00GHz  
2 "physical id"s (chips)
```

Continued on next page
Platform Notes (Continued)

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: 264641468 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 Oct 8 18:10

SPEC is set to: /home/SPECcpu-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 1600 MHz

(End of data from sysinfo program)

General Notes

Environment variables set by runspec before the start of the run:
LD_LIBRARY_PATH = */home/SPECcpu-20140116-ic14.0/11bs/32:/home/SPECcpu-20140116-ic14.0/11bs/64:/home/SPECcpu-20140116-ic14.0/sh*

Continued on next page
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.perlbench: -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

Continued on next page
# SPEC CINT2006 Result

**Lenovo Group Limited**

IBM System x iDataPlex dx360 M4  
(Intel Xeon E5-2640 v2, 2.00 GHz)

<table>
<thead>
<tr>
<th>SPECint_rate2006</th>
<th>541</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECint_rate_base2006</td>
<td>521</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

---

## 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`

---

Continued on next page
Lenovo Group Limited
IBM System x iDataPlex dx360 M4 (Intel Xeon E5-2640 v2, 2.00 GHz)

SPECint_rate2006 = 541
SPECint_rate_base2006 = 521

CPU2006 license: 9017
Test sponsor: Lenovo Group Limited
Tested by: IBM Corporation
Test date: Oct-2014
Hardware Availability: Dec-2013
Software Availability: Sep-2013

Peak Optimization Flags (Continued)

462.libquantum: basepeak = yes

464.h264ref: -xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2)
-03(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)
-03(pass 2) -no-prec-div(pass 2) -prof-use(pass 2)
-ansi-alias -opt-ra-region-strategy=block -Wl,-z,muldefs
-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

SPEC and SPECint are registered trademarks of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

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

Tested with SPEC CPU2006 v1.2.
Originally published on 4 November 2014.