IBM Corporation
IBM Flex System x440
(Intel Xeon E5-4620, 2.20 GHz)

**SPECint®2006 =** 41.4
**SPECint_base2006 =** 38.5

<table>
<thead>
<tr>
<th>Test sponsor:</th>
<th>IBM Corporation</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU2006 license:</td>
<td>11</td>
</tr>
<tr>
<td>Tested by:</td>
<td>IBM Corporation</td>
</tr>
<tr>
<td>Test date:</td>
<td>Aug-2012</td>
</tr>
<tr>
<td>Hardware Availability:</td>
<td>Aug-2012</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Dec-2011</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Software</th>
<th>Operating System: Red Hat Enterprise Linux Server release 6.2 (Santiago) 2.6.32-220.el6.x86_64</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compiler:</td>
<td>C++/++. Version 12.1.0.225 of Intel C++ Studio XE for Linux</td>
</tr>
<tr>
<td>Auto Parallel:</td>
<td>Yes</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>32/64-bit</td>
</tr>
<tr>
<td>Peak Pointers:</td>
<td>32/64-bit</td>
</tr>
<tr>
<td>Other Software:</td>
<td>Microquill SmartHeap V9.01</td>
</tr>
</tbody>
</table>

### Hardware

<table>
<thead>
<tr>
<th>CPU Name:</th>
<th>Intel Xeon E5-4620</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Characteristics:</td>
<td>Intel Turbo Boost Technology up to 2.60 GHz</td>
</tr>
<tr>
<td>CPU MHz:</td>
<td>2200</td>
</tr>
<tr>
<td>FPU:</td>
<td>Integrated</td>
</tr>
<tr>
<td>CPU(s) enabled:</td>
<td>32 cores, 4 chips, 8 cores/chip, 2 threads/core</td>
</tr>
<tr>
<td>CPU(s) orderable:</td>
<td>1,2,3,4 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>16 MB I+D on chip per core</td>
</tr>
<tr>
<td>Other Cache:</td>
<td>None</td>
</tr>
<tr>
<td>Memory:</td>
<td>256 GB (32 x 8 GB 2Rx4 PC3-12800R-11, ECC, running at 1333 MHz)</td>
</tr>
<tr>
<td>Disk Subsystem:</td>
<td>1 x 300 GB SAS, 10000 RPM</td>
</tr>
<tr>
<td>Other Hardware:</td>
<td>None</td>
</tr>
</tbody>
</table>
IBM Corporation
IBM Flex System x440
(Intel Xeon E5-4620, 2.20 GHz)

SPECint2006 = 41.4
SPECint_base2006 = 38.5

Results Table

<table>
<thead>
<tr>
<th>Benchmark</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>423</td>
<td>23.1</td>
<td>422</td>
<td>23.2</td>
<td>423</td>
<td>23.1</td>
<td>355</td>
<td>27.5</td>
</tr>
<tr>
<td>401.bzip2</td>
<td>559</td>
<td>17.2</td>
<td>560</td>
<td>17.2</td>
<td>560</td>
<td>17.2</td>
<td>541</td>
<td>17.9</td>
</tr>
<tr>
<td>403.mcf</td>
<td>336</td>
<td>23.9</td>
<td>337</td>
<td>23.9</td>
<td>337</td>
<td>23.9</td>
<td>333</td>
<td>24.2</td>
</tr>
<tr>
<td>429.gcc</td>
<td>176</td>
<td>51.8</td>
<td>174</td>
<td>52.5</td>
<td>175</td>
<td>52.1</td>
<td>176</td>
<td>52.5</td>
</tr>
<tr>
<td>445.gobmk</td>
<td>591</td>
<td>17.7</td>
<td>592</td>
<td>17.7</td>
<td>592</td>
<td>17.7</td>
<td>529</td>
<td>19.8</td>
</tr>
<tr>
<td>456.hmmer</td>
<td>238</td>
<td>39.2</td>
<td>237</td>
<td>39.4</td>
<td>237</td>
<td>39.4</td>
<td>229</td>
<td>40.8</td>
</tr>
<tr>
<td>458.sjeng</td>
<td>558</td>
<td>21.7</td>
<td>558</td>
<td>21.7</td>
<td>558</td>
<td>21.7</td>
<td>558</td>
<td>21.7</td>
</tr>
<tr>
<td>462.libquantum</td>
<td>8.69</td>
<td>2380</td>
<td>8.69</td>
<td>2380</td>
<td>8.69</td>
<td>2380</td>
<td>8.69</td>
<td>2380</td>
</tr>
<tr>
<td>464.hmmer</td>
<td>673</td>
<td>32.9</td>
<td>677</td>
<td>32.7</td>
<td>674</td>
<td>32.8</td>
<td>538</td>
<td>41.1</td>
</tr>
<tr>
<td>471.omnetpp</td>
<td>307</td>
<td>20.3</td>
<td>310</td>
<td>20.2</td>
<td>310</td>
<td>20.2</td>
<td>245</td>
<td>25.5</td>
</tr>
<tr>
<td>473.astar</td>
<td>311</td>
<td>22.6</td>
<td>313</td>
<td>22.4</td>
<td>312</td>
<td>22.5</td>
<td>311</td>
<td>22.6</td>
</tr>
<tr>
<td>483.xalancbmk</td>
<td>173</td>
<td>39.8</td>
<td>174</td>
<td>39.8</td>
<td>172</td>
<td>40.0</td>
<td>168</td>
<td>41.1</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"

Platform Notes

Operating Mode set to Maximum Performance in BIOS
Sysinfo program /cpu2006.1.2/config/sysinfo.re7800
$Rev: 6800 $ $Date:: 2011-10-11 #$ 6f2ebdf5f032aaa42e583f96b07f99d3
running on congo-pete Sun Aug 26 05:58:56 2012

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 E5-4620 0 @ 2.20GHz
  4 "physical id"s (chips)
  64 "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
physical 2: cores 0 1 2 3 4 5 6 7
physical 3: cores 0 1 2 3 4 5 6 7
cache size : 16384 KB

Continued on next page
IBM Corporation
IBM Flex System x440
(Intel Xeon E5-4620, 2.20 GHz)

SPECint2006 = 41.4
SPECint_base2006 = 38.5

Platform Notes (Continued)

From /proc/meminfo
MemTotal: 264501720 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

/usr/bin/lsb_release -d
   Red Hat Enterprise Linux Server release 6.2 (Santiago)

From /etc/*release* /etc/*version*
redhat-release: Red Hat Enterprise Linux Server release 6.2 (Santiago)
system-release: Red Hat Enterprise Linux Server release 6.2 (Santiago)

uname -a:
   Linux congo-pete 2.6.32-220.el6.x86_64 #1 SMP Wed Nov 9 08:03:13 EST 2011
   x86_64 x86_64 x86_64 GNU/Linux
run-level 3 Aug 24 10:59

SPEC is set to: /cpu2006.1.2
   Filesystem Type Size Used Avail Use% Mounted on
   /dev/mapper/vg_congopete-lv_root ext4 264G 5.9G 245G 3% /

Additional information from dmidecode:
   Memory:
      32x Micron 36JSF1G72PZ-1G6M1 8 GB 1600 MHz 2 rank

(End of data from sysinfo program)

General Notes

Environment variables set by runspec before the start of the run:
KMP_AFFINITY = "granularity=fine,scatter"
LD_LIBRARY_PATH = "/cpu2006.1.2/libs/32:/cpu2006.1.2/libs/64"
OMP_NUM_THREADS = "32"

Binaries compiled on a system with 1x Core i7-860 CPU + 8GB memory using RHEL5.5
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

Base Compiler Invocation

C benchmarks:
   ICC  -m64

Continued on next page
IBM Corporation
IBM Flex System x440
(Intel Xeon E5-4620, 2.20 GHz)

SPECint2006 = 41.4
SPECint_base2006 = 38.5

CPU2006 license: 11
Test sponsor: IBM Corporation
Tested by: IBM Corporation

Test date: Aug-2012
Hardware Availability: Aug-2012
Software Availability: Dec-2011

Base Compiler Invocation (Continued)

C++ benchmarks:
icpc -m64

Base Portability Flags

-DSPEC_CPU_LP64 -DSPEC_CPU_LINUX_X64

Base Optimization Flags

-xSSE4.2 -ipo -O3 -no-prec-div -parallel -opt-prefetch -auto-p32

C benchmarks:
400.perlbench: icc -m32
445.gobmk: icc -m32

Peak Compiler Invocation

C benchmarks (except as noted below):
icc -m64

400.perlbench: icc -m32
445.gobmk: icc -m32
SPEC CINT2006 Result

IBM Corporation
IBM Flex System x440
(Intel Xeon E5-4620, 2.20 GHz)

SPECint2006 = 41.4
SPECint_base2006 = 38.5

CPU2006 license: 11
Test sponsor: IBM Corporation
Tested by: IBM Corporation

Test date: Aug-2012
Hardware Availability: Aug-2012
Software Availability: Dec-2011

Peak Compiler Invocation (Continued)

464.h264ref: icc -m32

C++ benchmarks (except as noted below):
icpc -m32

473.astar: icpc -m64

Peak Portability Flags

400.perlbench: -DSPEC_CPU_LINUX_IA32
401.bzip2: -DSPEC_CPU_LP64
403.gcc: -DSPEC_CPU_LP64
429.mcf: -DSPEC_CPU_LP64
456.hmmer: -DSPEC_CPU_LP64
458.sjeng: -DSPEC_CPU_LP64
462.libquantum: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX
473.astar: -DSPEC_CPU_LP64
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)
-opt-prefetch -ansi-alias

401.bzip2: -xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2)
-O3(pass 2) -no-prec-div -prof-use(pass 2) -auto-ilp32
-opt-prefetch -ansi-alias

403.gcc: -xSSE4.2 -ipo -O3 -no-prec-div -inline-calloc
-opt-malloc-options=3 -auto-ilp32

429.mcf: basepeak = yes

445.gobmk: -xSSE4.2(pass 2) -prof-gen(pass 1) -prof-use(pass 2)
-ansi-alias

456.hmmer: -xSSE4.2 -ipo -O3 -no-prec-div -unroll2 -auto-ilp32
-ansi-alias

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

Continued on next page
IBM Corporation
IBM Flex System x440
(Intel Xeon E5-4620, 2.20 GHz)

SPECint2006 = 41.4
SPECint_base2006 = 38.5

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)
-opt-ra-region-strategy=block -ansi-alias
-Wl,-z,muldefs -L/smartheap -lsmartheap

473.astar: basepeak = yes
483.xalancbmk: -xsse4.2 -ipo -O3 -no-prec-div -opt-prefetch -ansi-alias
-Wl,-z,muldefs -L/smartheap -lsmartheap

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-ic12.1-official-linux64.20120425.html
http://www.spec.org/cpu2006/flags/IBM-Platform-Flags-V1.2-SNB-C.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/Intel-ic12.1-official-linux64.20120425.xml
http://www.spec.org/cpu2006/flags/IBM-Platform-Flags-V1.2-SNB-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 11 September 2012.