IBM Corporation
IBM System x3550 M4
(Intel Xeon E5-2628L v2, 1.90 GHz)

SPECint\textsubscript{rate}2006 = 500
SPECint\_rate\_base2006 = 481

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

Test date: Aug-2014
Hardware Availability: Dec-2013

CPU Name: Intel Xeon E5-2628L v2
CPU Characteristics: Intel Turbo Boost Technology up to 2.40 GHz
CPU MHz: 1900
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 400 GB SAS SSD, RAID 0
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

Software

Hardware
IBM Corporation

IBM System x3550 M4
(Intel Xeon E5-2628L v2, 1.90 GHz)

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

SPEC CINT2006 Result

SPECint_rate2006 = 500
SPECint_rate_base2006 = 481

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>
</tr>
</thead>
<tbody>
<tr>
<td>400.perlbench</td>
<td>32</td>
<td>901</td>
<td>347</td>
<td>901</td>
<td>347</td>
<td>900</td>
<td>347</td>
<td>32</td>
<td>752</td>
</tr>
<tr>
<td>401.bzip2</td>
<td>32</td>
<td>1196</td>
<td>258</td>
<td>1207</td>
<td>256</td>
<td>1197</td>
<td>258</td>
<td>32</td>
<td>1172</td>
</tr>
<tr>
<td>403.gcc</td>
<td>32</td>
<td>659</td>
<td>391</td>
<td>660</td>
<td>390</td>
<td>665</td>
<td>387</td>
<td>32</td>
<td>659</td>
</tr>
<tr>
<td>429.mcf</td>
<td>32</td>
<td>372</td>
<td>785</td>
<td>372</td>
<td>785</td>
<td>373</td>
<td>783</td>
<td>32</td>
<td>372</td>
</tr>
<tr>
<td>445.gobmk</td>
<td>32</td>
<td>972</td>
<td>345</td>
<td>989</td>
<td>340</td>
<td>989</td>
<td>339</td>
<td>32</td>
<td>957</td>
</tr>
<tr>
<td>456.hmmer</td>
<td>32</td>
<td>470</td>
<td>635</td>
<td>470</td>
<td>635</td>
<td>470</td>
<td>635</td>
<td>32</td>
<td>421</td>
</tr>
<tr>
<td>458.sjeng</td>
<td>32</td>
<td>1144</td>
<td>338</td>
<td>1137</td>
<td>340</td>
<td>1141</td>
<td>339</td>
<td>32</td>
<td>1097</td>
</tr>
<tr>
<td>462.libquantum</td>
<td>32</td>
<td>216</td>
<td>3070</td>
<td>216</td>
<td>3070</td>
<td>216</td>
<td>3070</td>
<td>32</td>
<td>216</td>
</tr>
<tr>
<td>464.h264ref</td>
<td>32</td>
<td>1231</td>
<td>575</td>
<td>1230</td>
<td>576</td>
<td>1228</td>
<td>577</td>
<td>32</td>
<td>1216</td>
</tr>
<tr>
<td>471.omnetpp</td>
<td>32</td>
<td>698</td>
<td>286</td>
<td>700</td>
<td>286</td>
<td>702</td>
<td>285</td>
<td>32</td>
<td>661</td>
</tr>
<tr>
<td>473.astar</td>
<td>32</td>
<td>792</td>
<td>284</td>
<td>786</td>
<td>286</td>
<td>795</td>
<td>282</td>
<td>32</td>
<td>792</td>
</tr>
<tr>
<td>483.xalancbmk</td>
<td>32</td>
<td>410</td>
<td>538</td>
<td>410</td>
<td>538</td>
<td>411</td>
<td>537</td>
<td>32</td>
<td>410</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:
in.tel_idle.max_cstate=0

Platform Notes

BIOS setting:
Operating Mode set to Maximum Performance
Sysinfo program /home/SPECcpu-20140116-ic14.0/config/sysinfo.rev6818
$Rev: 6818 $ $Date:: 2012-07-17 #$ e86d102572650a6e4d596a3cee98f191
running on x3550M4 Wed Aug 20 23:01:52 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 E5-2628L v2 @ 1.90GHz
2 "physical id"s (chips)

Continued on next page
**IBM Corporation**

IBM System x3550 M4  
(Intel Xeon E5-2628L v2, 1.90 GHz)

**SPEC CINT2006 Result**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECint_rate2006</td>
<td>500</td>
</tr>
<tr>
<td>SPECint_rate_base2006</td>
<td>481</td>
</tr>
</tbody>
</table>

**CPU2006 license:** 11  
**Test date:** Aug-2014

**Test sponsor:** IBM Corporation  
**Hardware Availability:** Dec-2013

**Tested by:** IBM Corporation  
**Software Availability:** Sep-2013

---

**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: 264463528 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 x3550M4 2.6.32-358.18.1.el6.x86_64 #1 SMP Fri Aug 2 17:04:38 EDT 2013
x86_64 x86_64 x86_64 GNU/Linux
```

run-level 3 Aug 19 17:01

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

Additional information from dmidecode:
BIOS IBM -[D7E139YUS-1.70]- 05/13/2014
Memory:
  8x Not Specified Not Specified
  16x Samsung M393B2G70QH0-CMA 16 GB 1600 MHz 2 rank

(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/libs/32:/home/SPECcpu-20140116-ic14.0/libs/64:/home/SPECcpu-20140116-ic14.0/sh
```

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
```

Continued on next page
IBM Corporation

IBM System x3550 M4
(Intel Xeon E5-2628L v2, 1.90 GHz)

SPECint_rate2006 = 500
SPECint_rate_base2006 = 481

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

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

General Notes (Continued)

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

400.perlbench: icc -m64

Continued on next page
Peak Compiler Invocation (Continued)

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
462.libquantum: basepeak = yes
IBM Corporation
IBM System x3550 M4
(Intel Xeon E5-2628L v2, 1.90 GHz)

**SPECint_rate2006 = 500**

**SPECint_rate_base2006 = 481**

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

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

### Peak Optimization Flags (Continued)

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
- -Wl,-z,muldefs
- -L/sh
- -lsmartheap

473.astar:
- basepeak = yes

483.xalanchbmk:
- 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-B.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-B.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 9 September 2014.