Lenovo Group Limited
IBM Flex System x240 M5
(Intel Xeon E5-2658 v3, 2.20 GHz)

SPECint\textsuperscript{\textregistered}\textsubscript{rate2006} = 968
SPECint\textsubscript{rate_base2006} = 938

CPU2006 license: 11
Test sponsor: Lenovo Group Limited
Tested by: IBM Corporation

Hardware

<table>
<thead>
<tr>
<th>Component</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name</td>
<td>Intel Xeon E5-2658 v3</td>
</tr>
<tr>
<td>CPU Characteristics</td>
<td>Intel Turbo Boost Technology up to 2.90 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>24 cores, 2 chips, 12 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>30 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 PC4-2133P-R)</td>
</tr>
<tr>
<td>Disk Subsystem</td>
<td>1 x 1 TB SAS, 7200 RPM</td>
</tr>
<tr>
<td>Other Hardware</td>
<td>None</td>
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</tbody>
</table>

Software

<table>
<thead>
<tr>
<th>Component</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating System</td>
<td>Red Hat Enterprise Linux Server release 6.5 (Santiago)</td>
</tr>
<tr>
<td>Compiler</td>
<td>C/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 Flex System x240 M5
(Intel Xeon E5-2658 v3, 2.20 GHz)

SPEC CINT2006 Result

SPECint_rate2006 = 968
SPECint_rate_base2006 = 938

CPU2006 license: 11
Test sponsor: Lenovo Group Limited
Tested by: IBM Corporation

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>
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</thead>
<tbody>
<tr>
<td>400.perlbench</td>
<td>48</td>
<td>659</td>
<td>712</td>
<td>655</td>
<td>716</td>
<td>657</td>
<td>713</td>
<td>48</td>
<td>534</td>
<td>878</td>
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<tr>
<td>401.bzip2</td>
<td>48</td>
<td>994</td>
<td>466</td>
<td>993</td>
<td>467</td>
<td>993</td>
<td>467</td>
<td>48</td>
<td>953</td>
<td>486</td>
<td>950</td>
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<td>403.gcc</td>
<td>48</td>
<td>529</td>
<td>731</td>
<td>529</td>
<td>730</td>
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<td>529</td>
<td>731</td>
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<td>429.mcf</td>
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<td>335</td>
<td>1310</td>
<td>337</td>
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<td>48</td>
<td>332</td>
<td>1320</td>
<td>335</td>
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<td>445.gobmk</td>
<td>48</td>
<td>808</td>
<td>623</td>
<td>809</td>
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<td>808</td>
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<td>48</td>
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<td>456.hmmer</td>
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<td>344</td>
<td>1300</td>
<td>350</td>
<td>1280</td>
<td>346</td>
<td>1290</td>
<td>48</td>
<td>342</td>
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<tr>
<td>458.sjeng</td>
<td>48</td>
<td>877</td>
<td>662</td>
<td>877</td>
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<td>876</td>
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<td>462.libquantum</td>
<td>48</td>
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<td>111</td>
<td>9000</td>
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<td>8990</td>
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<td>464.h264ref</td>
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<td>963</td>
<td>1100</td>
<td>978</td>
<td>1090</td>
<td>951</td>
<td>1120</td>
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<td>954</td>
<td>1110</td>
<td>956</td>
</tr>
<tr>
<td>471.omnetpp</td>
<td>48</td>
<td>564</td>
<td>532</td>
<td>560</td>
<td>535</td>
<td>562</td>
<td>534</td>
<td>48</td>
<td>535</td>
<td>561</td>
<td>535</td>
</tr>
<tr>
<td>473.astar</td>
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<td>658</td>
<td>512</td>
<td>660</td>
<td>511</td>
<td>664</td>
<td>508</td>
<td>48</td>
<td>658</td>
<td>512</td>
<td>660</td>
</tr>
<tr>
<td>483.xalancbmk</td>
<td>48</td>
<td>328</td>
<td>1010</td>
<td>327</td>
<td>1010</td>
<td>328</td>
<td>1010</td>
<td>48</td>
<td>328</td>
<td>1010</td>
<td>328</td>
</tr>
</tbody>
</table>

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

Submit Notes

The numacl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numaclt 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"

Platform Notes

Fan speed set to 100%
Operating Mode set to Maximum Performance in BIOS
Enable COD Preference in BIOS
Disable Early Snoop Preference in BIOS
Sysinfo program /cpu2006.1.2/config/sysinfo.rev6818
$Rev: 6818 $ $Date:: 2012-07-17 #$ e86d102572650a6e4d596a3cee98f191
running on Bonneville-SPECcpu Wed Jan 21 21:36:13 2015

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 E5-2658 v3 @ 2.20GHz
  2 "physical id"s (chips)
  48 "processors"
cores, siblings (Caution: counting these is hw and system dependent. The Continued on next page

Standard Performance Evaluation Corporation
info@spec.org
http://www.spec.org/
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Platform Notes (Continued)

following excerpts from /proc/cpuinfo might not be reliable. Use with caution.

- CPU cores: 12
- Siblings: 24
- Physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 13
- Physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 13
- Cache size: 15360 KB

From /proc/meminfo
- MemTotal: 264119260 KB
- HugePages_Total: 0
- Hugepagesize: 2048 KB

From /usr/bin/lsb_release -d
- Red Hat Enterprise Linux Server release 6.5 (Santiago)

From /etc/*release* /etc/*version*
- Redhat-release: Red Hat Enterprise Linux Server release 6.5 (Santiago)
- System-release: Red Hat Enterprise Linux Server release 6.5 (Santiago)

uname -a:
- Linux Bonneville-SPECcpu 2.6.32-431.el6.x86_64 #1 SMP Sun Nov 10 22:19:54 EST 2013 x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Jan 21 14:45 last=5

SPEC is set to: /cpu2006.1.2

Filesystem Type Size Used Avail Use% Mounted on
/dev/mapper/vg_bonnevillespe-lv_root ext4 356G 14G 324G 4% /

Additional information from dmidecode:
- BIOS IBM -[C4E103EUS-1.00]- 11/25/2014
- Memory:
  - 8x NO DIMM Unknown
  - 16x Samsung M393A2G40DB0-CPB 16 GB 2133 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 = "/cpu2006.1.2/libs/32:/cpu2006.1.2/libs/64:/cpu2006.1.2/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
Filesystem page cache cleared with:
  - echo 1> /proc/sys/vm/drop_caches
runspec command invoked through numactl i.e.:

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Hardware Availability: Dec-2014
Software Availability: Nov-2013

General Notes (Continued)
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:
-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch
-.opt-mem-layout-trans=3
C++ benchmarks:
-xCORE-AVX2 -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
401.bzip2: icc -m64

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Peak Compiler Invocation (Continued)

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: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2) -auto-ilp32
        -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2) -auto-ilp32
        -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2) -auto-ilp32
        -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2) -auto-ilp32

403.gcc: basepeak = yes
429.mcf: basepeak = yes
445.gobmk: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -prof-use(pass 2) -ansi-alias -opt-mem-layout-trans=3
456.hmmer: -xCORE-AVX2 -ipo -O3 -no-prec-div -unroll2 -auto-ilp32
458.sjeng: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2) -unroll4 -auto-ilp32
        -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2)
        -unroll2 -ansi-alias
462.libquantum: basepeak = yes
464.h264ref: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2)
        -unroll2 -ansi-alias

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Peak Optimization Flags (Continued)

C++ benchmarks:

471.omnetpp: -xCORE-AVX2(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-HSW-B.20141021.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-HSW-B.20141021.xml

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For other inquiries, please contact webmaster@spec.org.

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