Dell Inc.
PowerEdge R940
(Intel Xeon Platinum 8160, 2.10 GHz)

SPECint®2006 = 78.6
SPECint_base2006 = 75.1

CPU2006 license: 55
Test sponsor: Dell Inc.
Tested by: Dell Inc.

SPECint2006 = 78.6
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Hardware

CPU Name: Intel Xeon Platinum 8160
CPU Characteristics: Intel Turbo Boost Technology up to 3.70 GHz
CPU MHz: 2100
FPU: Integrated
CPU(s) enabled: 96 cores, 4 chips, 24 cores/chip
CPU(s) orderable: 2.4 chip
Primary Cache: 32 KB I + 32 KB D on chip per core
Secondary Cache: 1 MB I+D on chip per core
L3 Cache: 33 MB I+D on chip per chip
Other Cache: None
Memory: 768 GB (48 x 16 GB 2Rx8 PC4-2666V-R)
Disk Subsystem: 1 x 900 GB 15K RPM SAS12
Other Hardware: None

Software

Operating System: SUSE Linux Enterprise Server 12 (x86_64) SP2 4.4.21-69-default
Compiler: C/C++: Version 17.0.3.191 of Intel C/C++ Compiler for Linux
Auto Parallel: Yes
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 32/64-bit
Peak Pointers: 32/64-bit
Other Software: Microquill SmartHeap V10.2
SPEC CINT2006 Result

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Test date: Oct-2017
Hardware Availability: Jul-2017
Software Availability: Apr-2017

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<th>Seconds</th>
<th>Ratio</th>
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<tbody>
<tr>
<td>400.perlbench</td>
<td>210</td>
<td>46.6</td>
<td>208</td>
<td>47.0</td>
<td>208</td>
<td>46.9</td>
<td>184</td>
<td>53.2</td>
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<td>53.2</td>
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<tr>
<td>403.gcc</td>
<td>236</td>
<td>34.0</td>
<td>237</td>
<td>34.0</td>
<td>238</td>
<td>33.8</td>
<td>234</td>
<td>34.4</td>
<td>239</td>
<td>33.7</td>
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<tr>
<td>429.mcf</td>
<td>116</td>
<td>78.8</td>
<td>118</td>
<td>77.2</td>
<td>118</td>
<td>77.6</td>
<td>118</td>
<td>77.1</td>
<td>117</td>
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<tr>
<td>456.hmmer</td>
<td>95.7</td>
<td>97.5</td>
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<td>37.1</td>
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<td>37.2</td>
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<td>462.libquantum</td>
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<td>464.h264ref</td>
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<td>67.7</td>
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<tr>
<td>471.omnetpp</td>
<td>147</td>
<td>42.5</td>
<td>165</td>
<td>37.9</td>
<td>151</td>
<td>41.3</td>
<td>114</td>
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<td>115</td>
<td>54.5</td>
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<td>473.astar</td>
<td>179</td>
<td>39.3</td>
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<td>39.2</td>
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<td>180</td>
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<td>483.xalancbmk</td>
<td>83.8</td>
<td>82.3</td>
<td>83.7</td>
<td>82.4</td>
<td>81.1</td>
<td>85.0</td>
<td>76.3</td>
<td>90.4</td>
<td>75.1</td>
<td>91.9</td>
</tr>
</tbody>
</table>

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

Submit Notes

The config file option 'submit' was used.

Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"

Platform Notes

BIOS settings:
Logical Processor Disabled
Virtualization Technology Disabled
Sub NUMA Cluster Disabled
System Profile set to Custom
CPU Performance set to Maximum Performance
C1E Disabled
C States set to Autonomous
Uncore Frequency set to Dynamic
Memory Patrol Scrub Disabled
Energy Efficiency Policy set to Performance
CPU Interconnect Bus Link Power Management Disabled
PCI ASPM L1 Link Power Management Disabled
Sysinfo program /home/cpu2006/config/sysinfo.rev6993
Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
running on linux-ehog Fri Oct 13 08:59:59 2017

This section contains SUT (System Under Test) info as seen by some common utilities. To remove or add to this section, see:
Continued on next page
Dell Inc.

PowerEdge R940
(Intel Xeon Platinum 8160, 2.10 GHz)

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CPU2006 license: 55
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Platform Notes (Continued)

http://www.spec.org/cpu2006/Docs/config.html#sysinfo

From /proc/cpuinfo
model name : Intel(R) Xeon(R) Platinum 8160 CPU @ 2.10GHz
  4 "physical id"s (chips)
  96 "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 : 24
siblings : 24
physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29
physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29
physical 2: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29
physical 3: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29
cache size : 33792 KB

From /proc/meminfo
MemTotal: 791225344 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

/usr/bin/lsb_release -d
SUSE Linux Enterprise Server 12 SP2

From /etc/*release* /etc/*version*
SuSE-release:
  SUSE Linux Enterprise Server 12 (x86_64)
  VERSION = 12
  PATCHLEVEL = 2
  # This file is deprecated and will be removed in a future service pack or release.
  # Please check /etc/os-release for details about this release.
  os-release:
    NAME="SLES"
    VERSION="12-SP2"
    VERSION_ID="12.2"
    PRETTY_NAME="SUSE Linux Enterprise Server 12 SP2"
    ID="sles"
    ANSI_COLOR="0;32"
    CPE_NAME="cpe:/o:suse:sles:12:sp2"

uname -a:
(9464f67) x86_64 x86_64 x86_64 GNU/Linux
run-level 3 Oct 13 08:59

Continued on next page
 SPEC CINT2006 Result

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Platform Notes (Continued)

SPEC is set to: /home/cpu2006
Filesystem     Type  Size  Used Avail Use% Mounted on
/dev/sda4      xfs   796G   17G  779G   3% /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 Dell Inc. 1.1.7 08/10/2017
Memory:
48x 00AD00B300AD HMA82GR7AFR8N-VK 16 GB 2 rank 2666 MHz

(End of data from sysinfo program)

General Notes

Environment variables set by runspec before the start of the run:
KMP_AFFINITY = "granularity=fine,compact"
LD_LIBRARY_PATH = "/home/cpu2006/lib/ia32:/home/cpu2006/lib/intel64:/home/cpu2006/sh10.2"
OMP_NUM_THREADS = "96"

Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM
memory using Redhat Enterprise Linux 7.2
Transparent Huge Pages enabled by default.
Filesystem page cache cleared with:
shell invocation of 'sync; echo 3 > /proc/sys/vm/drop_caches' prior to run

Base Compiler Invocation

C benchmarks:
icc -m64

C++ benchmarks:
icpc -m64

Base Portability Flags

400.perlbench: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX_X64
401.bzip2: -DSPEC_CPU_LP64
403.gcc: -DSPEC_CPU_LP64
429.mcf: -DSPEC_CPU_LP64
445.gobmk: -DSPEC_CPU_LP64
456.hmmer: -DSPEC_CPU_LP64
458.sjeng: -DSPEC_CPU_LP64

Continued on next page
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### Base Portability Flags (Continued)

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</tr>
<tr>
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<td>471.omnetpp: -DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>473.astar: -DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>483.xalancbmk: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX</td>
</tr>
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</table>

### Base Optimization Flags

- **C benchmarks:**
  - -xCORE-AVX2
  - -ipo
  - -O3
  - -no-prec-div
  - -qopt-prefetch
  - -auto-p32

- **C++ benchmarks:**
  - -xCORE-AVX2
  - -ipo
  - -O3
  - -no-prec-div
  - -qopt-prefetch
  - -auto-p32
  - -Wl,-z,muldefs
  - -L/sh10.2
  - -lsmartheap64

### Base Other Flags

- **C benchmarks:**
  - 403.gcc: -Dalloca=_alloca

### Peak Compiler Invocation

- **C benchmarks (except as noted below):**
  - icc -m64
  - 400.perlbench: icc -m32 -L/opt/intel/compilers_and_libraries_2017/linux/lib/ia32
  - 445.gobmk: icc -m32 -L/opt/intel/compilers_and_libraries_2017/linux/lib/ia32

- **C++ benchmarks (except as noted below):**
  - icc -m32 -L/opt/intel/compilers_and_libraries_2017/linux/lib/ia32
  - 473.astar: icpc -m64

### Peak Portability Flags

- 400.perlbench: -D FILE_OFFSET_BITS=64 -DSPEC_CPU_LINUX_IA32
- 401.bzip2: -DSPEC_CPU_LP64
- 403.gcc: -DSPEC_CPU_LP64

Continued on next page
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Peak Portability Flags (Continued)

429.mcf: -DSPEC_CPU_LP64
445.gobmk: -D_FILE_OFFSET_BITS=64
456.hmmer: -DSPEC_CPU_LP64
458.sjeng: -DSPEC_CPU_LP64
462.libquantum: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX
464.h264ref: -DSPEC_CPU_LP64
471.omnetpp: -D_FILE_OFFSET_BITS=64
473.astar: -DSPEC_CPU_LP64
483.xalancbmk: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LINUX

Peak Optimization Flags

C benchmarks:

400.perlbench: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -qopt-prefetch

401.bzip2: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div -auto-ilp32 -qopt-prefetch

403.gcc: -xCORE-AVX2 -ipo -O3 -no-prec-div -inline-calloc
-qopt-malloc-options=3 -auto-ilp32

429.mcf: -xCORE-AVX2 -ipo -O3 -no-prec-div -parallel
-qopt-prefetch -auto-p32

445.gobmk: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2)

456.hmmer: basepeak = yes

458.sjeng: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -unroll4

462.libquantum: basepeak = yes

464.h264ref: basepeak = yes

C++ benchmarks:

471.omnetpp: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -qopt-ra-region-strategy=block
-Wl,-z,muldefs -L/sh10.2 -lsmartheap

Continued on next page
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Peak Optimization Flags (Continued)

473.aistar: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-auto-p32 -Wl,-z,muldefs -L/sh10.2 -lsmartheap64

483.xalancbmk: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-Wl,-z,muldefs -L/sh10.2 -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-ic17.0-official-linux64-revF.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/Intel-ic17.0-official-linux64-revF.xml

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

Tested with SPEC CPU2006 v1.2.