Dell Inc. (PowerEdge R940 (Intel Xeon Gold 5120, 2.20 GHz))

**SPECint_rate2006** = 2610
**SPECint_rate_base2006** = 2460

| Test date: | May-2017 |
| Hardware Availability: | Jul-2017 |
| Software Availability: | Nov-2016 |

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

<table>
<thead>
<tr>
<th>Hardware</th>
<th>Software</th>
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<tbody>
<tr>
<td>CPU Name:</td>
<td>Operating System: SUSE Linux Enterprise Server 12 SP2 4.4.21-69-default</td>
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<tr>
<td>CPU Characteristics:</td>
<td>Compiler: C/C++: Version 17.0.3.191 of Intel C/C++ Compiler for Linux</td>
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<tr>
<td>CPU MHz:</td>
<td>Auto Parallel: Yes</td>
</tr>
<tr>
<td>FPU:</td>
<td>File System: xfs</td>
</tr>
<tr>
<td>CPU(s) enabled:</td>
<td>System State: Run level 3 (multi-user)</td>
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<tr>
<td>CPU(s) orderable:</td>
<td>Base Pointers: 32-bit</td>
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<tr>
<td>Primary Cache:</td>
<td>Peak Pointers: 32/64-bit</td>
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<tr>
<td>Secondary Cache:</td>
<td>Other Software: Microquill SmartHeap V10.2</td>
</tr>
<tr>
<td>L3 Cache:</td>
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<tr>
<td>Other Cache:</td>
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<td>Memory:</td>
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<td>Disk Subsystem:</td>
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<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Run</th>
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<tr>
<td>perlbench</td>
<td>400</td>
<td>112</td>
<td>1790</td>
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<td>bzip2</td>
<td>401</td>
<td>112</td>
<td>1070</td>
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<td>gcc</td>
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<td>mcf</td>
<td>429</td>
<td>112</td>
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<td>gobmk</td>
<td>445</td>
<td>112</td>
<td>1380</td>
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<td>hammer</td>
<td>456</td>
<td>112</td>
<td>1600</td>
</tr>
<tr>
<td>sjeng</td>
<td>458</td>
<td>112</td>
<td>1450</td>
</tr>
<tr>
<td>libquantum</td>
<td>462</td>
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<td>h264ref</td>
<td>464</td>
<td>112</td>
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<td>omnetpp</td>
<td>471</td>
<td>112</td>
<td>1360</td>
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<tr>
<td>astar</td>
<td>473</td>
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<tr>
<td>xalancbmk</td>
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<td>3500</td>
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```

**SPECint_rate2006** = 2610
**SPECint_rate_base2006** = 2460
Dell Inc.

PowerEdge R940 (Intel Xeon Gold 5120, 2.20 GHz)

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

SPECint_rate2006 = 2610
SPECint_rate_base2006 = 2460

Results Table

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<tr>
<th>Benchmark</th>
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<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<td>497</td>
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<td>456.hmmer</td>
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<td>462.libquantum</td>
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<td>59.2</td>
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<td>990</td>
<td>2500</td>
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<td>473.astar</td>
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<td>483.xalancbmk</td>
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<td>3020</td>
<td>257</td>
<td>3000</td>
<td>112</td>
<td>258</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"

Platform Notes

BIOS settings:
Sub NUMA Cluster enabled
Virtualization Technology disabled
System Profile set to Custom
CPU Performance set to Maximum Performance
C States set to autonomous
C1E disabled
Uncore Frequency set to Dynamic
Energy Efficiency Policy set to Performance
Memory Patrol Scrub disabled
Logical Processor enabled
CPU Interconnect Bus Link Power Management disabled
PCI ASPM L1 Link Power Management disabled
Sysinfo program /home/cpu2006-1.2_ic17u3/config/sysinfo.rev6993
Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
running on linux-b14r Thu May 25 10:52:54 2017

Continued on next page
Dell Inc.

PowerEdge R940 (Intel Xeon Gold 5120, 2.20 GHz)

SPECint_rate2006 = 2610
SPECint_rate_base2006 = 2460

CPU2006 license: 55
Test sponsor: Dell Inc.
Test date: May-2017
Tested by: Dell Inc.
Hardware Availability: Jul-2017
Software Availability: Nov-2016

Platform Notes (Continued)

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) Gold 5120 CPU @ 2.20GHz
4 "physical id"s (chips)
112 "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 : 14
siblings : 28
physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
physical 2: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
physical 3: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
cache size : 19712 KB

From /proc/meminfo
MemTotal: 791001296 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:
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:
Linux linux-b14r 4.4.21-69-default #1 SMP Tue Oct 25 10:58:20 UTC 2016
(9464f67) x86_64 x86_64 x86_64 GNU/Linux

run-level 3 May 25 09:52

SPEC is set to: /home/cpu2006-1.2_ic17u3

Continued on next page
SPEC CINT2006 Result

Dell Inc.

PowerEdge R940 (Intel Xeon Gold 5120, 2.20 GHz)

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Platform Notes (Continued)
/dev/sda4 xfs 852G 104G 748G 13% /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. 1.0.0 05/16/2017
Memory:
48x 00CE063200CE M393A2K43BB1-CTD 16 GB 2 rank 2666 MHz, configured at 2400 MHz

(End of data from sysinfo program)

General Notes
Environment variables set by runspec before the start of the run:
LD_LIBRARY_PATH = "/home/cpu2006-1.2_ic17u3/lib/ia32:/home/cpu2006-1.2_ic17u3/lib/intel64:/home/cpu2006-1.2_ic17u3/sh10.2"

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
runspec command invoked through numactl i.e.:
numactl --interleave=all runspec <etc>

Base Compiler Invocation
C benchmarks:
icc -m32 -L/opt/intel/compilers_and_libraries_2017/linux/lib/ia32

C++ benchmarks:
icpc -m32 -L/opt/intel/compilers_and_libraries_2017/linux/lib/ia32

Base Portability Flags
400.perlbench: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LINUX_IA32
401.bzip2: -D_FILE_OFFSET_BITS=64
403.gcc: -D_FILE_OFFSET_BITS=64
429.mcf: -D_FILE_OFFSET_BITS=64
445.gobmk: -D_FILE_OFFSET_BITS=64
456.hmmer: -D_FILE_OFFSET_BITS=64
458.sjeng: -D_FILE_OFFSET_BITS=64
462.libquantum: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LINUX

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Dell Inc. PowerEdge R940 (Intel Xeon Gold 5120, 2.20 GHz)

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Base Portability Flags (Continued)

464.h264ref: -D_FILE_OFFSET_BITS=64
471.omnetpp: -D_FILE_OFFSET_BITS=64
473.astar: -D_FILE_OFFSET_BITS=64
483.xalancbmk: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LINUX

Base Optimization Flags

C benchmarks:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-qopt-mem-layout-trans=3

C++ benchmarks:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-qopt-mem-layout-trans=3 -Wl,-z,muldefs -L/sh10.2 -lsmartheap

Base Other Flags

C benchmarks:
403.gcc: -Dalloca=_alloca

Peak Compiler Invocation

C benchmarks (except as noted below):
icc -m32 -L/opt/intel/compilers_and_libraries_2017/linux/lib/ia32
400.perlbench: icc -m64
401.bzip2: icc -m64
456.hmmer: icc -m64
458.sjeng: icc -m64

C++ benchmarks:
icpc -m32 -L/opt/intel/compilers_and_libraries_2017/linux/lib/ia32

Peak Portability Flags

400.perlbench: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX_X64
401.bzip2: -DSPEC_CPU_LP64

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Dell Inc.

PowerEdge R940 (Intel Xeon Gold 5120, 2.20 GHz)

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Tested by: Dell Inc.

Test date: May-2017
Hardware Availability: Jul-2017
Software Availability: Nov-2016

Peak Portability Flags (Continued)

403.gcc: -D_FILE_OFFSET_BITS=64
429.mcf: -D_FILE_OFFSET_BITS=64
445.gobmk: -D_FILE_OFFSET_BITS=64
456.hmmer: -DSPEC_CPU_LP64
458.sjeng: -DSPEC_CPU_LP64
462.libquantum: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LINUX
464.h264ref: -D_FILE_OFFSET_BITS=64
471.omnetpp: -D_FILE_OFFSET_BITS=64
473.astar: -D_FILE_OFFSET_BITS=64
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-AVX512(pass 2)
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -auto-ilp32 -qopt-mem-layout-trans=3

401.bzip2: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512(pass 2)
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -qopt-prefetch -auto-ilp32
-qopt-mem-layout-trans=3

403.gcc: -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3

429.mcf: basepeak = yes

445.gobmk: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512(pass 2)
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -qopt-mem-layout-trans=3

456.hmmer: -xCORE-AVX512 -ipo -O3 -no-prec-div -unroll2 -auto-ilp32
-qopt-mem-layout-trans=3

458.sjeng: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512(pass 2)
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -unroll4 -auto-ilp32
-qopt-mem-layout-trans=3

462.libquantum: basepeak = yes

464.h264ref: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512(pass 2)
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -unroll2 -qopt-mem-layout-trans=3

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Dell Inc.

PowerEdge R940 (Intel Xeon Gold 5120, 2.20 GHz)

**SPECint_rate2006 = 2610**

**SPECint_rate_base2006 = 2460**

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<td>Nov-2016</td>
</tr>
</tbody>
</table>

### Peak Optimization Flags (Continued)

C++ benchmarks:

- 471.omnetpp: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512(pass 2)
- par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
- no-prec-div(pass 2)
- qopt-ra-region-strategy=block
- qopt-mem-layout-trans=3 -Wl,-z,muldefs
- L/sh10.2 -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-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
http://www.spec.org/cpu2006/flags/Dell-Platform-Flags-PowerEdge14G-revB.xml

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

Tested with SPEC CPU2006 v1.2.