## Dell Inc.

**PowerEdgeFC640 (Intel Xeon Silver 4109T, 2.00 GHz)**

<table>
<thead>
<tr>
<th>Specint®2006</th>
<th>59.6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specint_base2006</td>
<td>57.4</td>
</tr>
</tbody>
</table>

**CPU2006 license:** 55

**Test date:** Sep-2017

**Test sponsor:** Dell Inc.

**Tested by:** Dell Inc.

**Hardware Availability:** Sep-2017

**Software Availability:** Sep-2017

### SPECint2006 = 59.6

### SPECint_base2006 = 57.4

### Hardware

<table>
<thead>
<tr>
<th>CPU Name:</th>
<th>Intel Xeon Silver 4109T</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Characteristics:</td>
<td>Intel Turbo Boost Technology up to 3.00 GHz</td>
</tr>
<tr>
<td>CPU MHZ:</td>
<td>2000</td>
</tr>
<tr>
<td>FPU:</td>
<td>Integrated</td>
</tr>
<tr>
<td>CPU(s) enabled:</td>
<td>16 cores, 2 chips, 8 cores/chip, 2 threads/core</td>
</tr>
<tr>
<td>CPU(s) orderable:</td>
<td>1.2 chip</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>1 MB I+D on chip per core</td>
</tr>
<tr>
<td>L3 Cache:</td>
<td>11 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other Cache:</td>
<td>None</td>
</tr>
<tr>
<td>Memory:</td>
<td>192 GB (12 x 16 GB 2Rx8 PC4-2666V-R, running at 2400 MT/s)</td>
</tr>
<tr>
<td>Disk Subsystem:</td>
<td>1 x 960 GB SATA SSD</td>
</tr>
<tr>
<td>Other Hardware:</td>
<td>None</td>
</tr>
</tbody>
</table>

### Software

<table>
<thead>
<tr>
<th>Operating System:</th>
<th>SUSE Linux Enterprise Server 12 SP3 4.4.70-2-default</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compiler:</td>
<td>C/C++: Version 17.0.3.191 of Intel C/C++ Compiler for Linux</td>
</tr>
<tr>
<td>Auto Parallel:</td>
<td>Yes</td>
</tr>
<tr>
<td>File System:</td>
<td>btrfs</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 V10.2</td>
</tr>
</tbody>
</table>
## SPEC CINT2006 Result

Dell Inc.

PowerEdgeFC640 (Intel Xeon Silver 4109T, 2.00 GHz)

**SPECint2006 = 59.6**

**SPECint_base2006 = 57.4**

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Base</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Peak</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>257</td>
<td>38.0</td>
<td>257</td>
<td>38.1</td>
<td>257</td>
<td>38.0</td>
<td>226</td>
<td>43.2</td>
<td>226</td>
<td>43.2</td>
<td>226</td>
<td>43.2</td>
</tr>
<tr>
<td>401.bzip2</td>
<td>411</td>
<td>23.3</td>
<td>411</td>
<td>23.3</td>
<td>411</td>
<td>23.3</td>
<td>411</td>
<td>23.5</td>
<td>411</td>
<td>23.5</td>
<td>411</td>
<td>23.5</td>
</tr>
<tr>
<td>403.gcc</td>
<td>136</td>
<td>67.3</td>
<td>133</td>
<td>68.4</td>
<td>135</td>
<td>67.8</td>
<td>137</td>
<td>66.7</td>
<td>138</td>
<td>66.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>445.gobmk</td>
<td>393</td>
<td>26.7</td>
<td>392</td>
<td>26.7</td>
<td>393</td>
<td>26.7</td>
<td>384</td>
<td>27.3</td>
<td>384</td>
<td>27.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>456.hmmer</td>
<td>117</td>
<td>79.4</td>
<td>118</td>
<td>79.4</td>
<td>117</td>
<td>79.4</td>
<td>117</td>
<td>79.4</td>
<td>118</td>
<td>79.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>458.sjeng</td>
<td>403</td>
<td>30.1</td>
<td>403</td>
<td>30.1</td>
<td>403</td>
<td>30.0</td>
<td>395</td>
<td>30.7</td>
<td>395</td>
<td>30.7</td>
<td>394</td>
<td>30.7</td>
</tr>
<tr>
<td>462.libquantum</td>
<td>4.57</td>
<td>4530</td>
<td>4.60</td>
<td>4500</td>
<td>4.70</td>
<td>4410</td>
<td>4.57</td>
<td>4530</td>
<td>4.60</td>
<td>4500</td>
<td>4.70</td>
<td>4410</td>
</tr>
<tr>
<td>464.h264ref</td>
<td>406</td>
<td>54.5</td>
<td>406</td>
<td>54.5</td>
<td>406</td>
<td>54.5</td>
<td>406</td>
<td>54.5</td>
<td>406</td>
<td>54.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>471.omnetpp</td>
<td>273</td>
<td>22.9</td>
<td>267</td>
<td>23.4</td>
<td>268</td>
<td>23.3</td>
<td>214</td>
<td>29.3</td>
<td>212</td>
<td>29.4</td>
<td>212</td>
<td>29.5</td>
</tr>
<tr>
<td>473.astar</td>
<td>228</td>
<td>30.8</td>
<td>228</td>
<td>30.8</td>
<td>228</td>
<td>30.9</td>
<td>228</td>
<td>30.8</td>
<td>228</td>
<td>30.8</td>
<td>227</td>
<td>31.0</td>
</tr>
<tr>
<td>483.xalancbmk</td>
<td>104</td>
<td>66.1</td>
<td>103</td>
<td>66.8</td>
<td>103</td>
<td>66.8</td>
<td>96.5</td>
<td>71.5</td>
<td>96.1</td>
<td>71.2</td>
<td>96.5</td>
<td>71.5</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 disabled
  - Virtualization Technology disabled
  - System Profile set to Custom
  - CPU Performance set to Maximum Performance
  - C States set to Autonomous
  - C1E disabled
  - Energy Efficient Turbo 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 /root/cpu2006-1.2_ic17u3/config/sysinfo.rev6993
  - Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
  - running on linux-bek4 Fri Sep 1 05:57:34 2017

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SPEC CINT2006 Result

Dell Inc.

PowerEdgeFC640 (Intel Xeon Silver 4109T, 2.00 GHz)

SPECint2006 = 59.6
SPECint_base2006 = 57.4

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

Test date: Sep-2017
Hardware Availability: Sep-2017
Software Availability: Sep-2017

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) Silver 4109T CPU @ 2.00GHz
  2 "physical id"s (chips)
  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 : 11264 KB

From /proc/meminfo
MemTotal:       196687956 kB
HugePages_Total:       0
Hugepagesize:       2048 kB

From /etc/*release* /etc/*version*
SuSE-release:
  SUSE Linux Enterprise Server 12 (x86_64)
  VERSION = 12
  PATCHLEVEL = 3
  # 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-SP3"
  VERSION_ID="12.3"
  PRETTY_NAME="SUSE Linux Enterprise Server 12 SP3"
  ID="sles"
  ANSI_COLOR="0;32"
  CPE_NAME="cpe:/o:suse:sles:12:sp3"

uname -a:
Linux linux-bek4 4.4.70-2-default #1 SMP Wed Jun 7 15:12:06 UTC 2017
(4502c76) x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Aug 30 23:21

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

filesystem  type  size  used  avail  use%  mounted on
/dev/sda7  btrfs  855G  8.3G  847G  1%  /
Additional information from dmidecode:

Warning: Use caution when you interpret this section. The 'dmidecode' program
Continued on next page
Dell Inc.  
PowerEdgeFC640 (Intel Xeon Silver 4109T, 2.00 GHz)  

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**Platform Notes (Continued)**

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 08/10/2017  
Memory:  
12x 002C00B3002C 18ASF2G72PDZ-2G6D1 16 GB 2 rank 2666 MHz, configured at 2400 MHz  
4x Not Specified Not Specified  

(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 = "/root/cpu2006-1.2_ic17u3/lib/ia32:/root/cpu2006-1.2_ic17u3/lib/intel64:/root/cpu2006-1.2_ic17u3/sh10.2"  
OMP_NUM_THREADS = "16"  

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  
462.libquantum:  
-DSPEC_CPU_LP64  
-DSPEC_CPU_LINUX  
464.h264ref:  
-DSPEC_CPU_LP64  
471.omnetpp:  
-DSPEC_CPU_LP64  
473.astar:  
-DSPEC_CPU_LP64

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# SPEC CINT2006 Result

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### Base Portability Flags (Continued)

483.xalancbmk: `-DSPEC_CPU_LP64 -DSPEC_CPU_LINUX`

### Base Optimization Flags

- **C benchmarks:**
  - `-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -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`

429.mcf: `-DSPEC_CPU_LP64`

445.gobmk: `-D_FILE_OFFSET_BITS=64`

456.hmmer: `-DSPEC_CPU_LP64`

458.sjeng: `-DSPEC_CPU_LP64`
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Software Availability: Sep-2017

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**Peak Portability Flags (Continued)**

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.xalancbm: -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) -ipo-opt-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

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

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SPEC CINT2006 Result

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Peak Optimization Flags (Continued)
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.

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