# SPEC® CINT2006 Result

**Dell Inc.**

**PowerEdge FC640 (Intel Xeon Silver 4114, 2.20 GHz)**

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<thead>
<tr>
<th>SPECint®2006</th>
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**CPU2006 license:** 55  
**Test date:** Jun-2017  
**Test sponsor:** Dell Inc.  
**Hardware Availability:** Sep-2017  
**Tested by:** Dell Inc.  
**Software Availability:** Apr-2017

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<tr>
<th>Benchmark</th>
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<tr>
<td>perlbench</td>
<td>41.3</td>
<td>38.1</td>
</tr>
<tr>
<td>bzip2</td>
<td>23.5</td>
<td>23.3</td>
</tr>
<tr>
<td>gcc</td>
<td>56.2</td>
<td>58.4</td>
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<tr>
<td>mcf</td>
<td>46.2</td>
<td>45.8</td>
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<tr>
<td>gobmk</td>
<td>26.9</td>
<td>26.7</td>
</tr>
<tr>
<td>hammer</td>
<td>39.1</td>
<td>39.0</td>
</tr>
<tr>
<td>sjeng</td>
<td>30.3</td>
<td>30.1</td>
</tr>
<tr>
<td>libquantum</td>
<td>64.7</td>
<td>52.0</td>
</tr>
<tr>
<td>h264ref</td>
<td>55.1</td>
<td>55.1</td>
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<tr>
<td>omnetpp</td>
<td>31.8</td>
<td>31.8</td>
</tr>
<tr>
<td>astar</td>
<td>31.1</td>
<td>31.1</td>
</tr>
<tr>
<td>xalancbmk</td>
<td>31.2</td>
<td>31.2</td>
</tr>
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**Software**

- **Operating System:** SUSE Linux Enterprise Server 12 SP2 4.4.16-56-default
- **Compiler:** C/C++: Version 17.0.3.191 of Intel C/C++ Compiler for Linux
- **Auto Parallel:** Yes
- **File System:** btrfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 32/64-bit
- **Peak Pointers:** 32/64-bit
- **Other Software:** Microquill SmartHeap V10.2

**Hardware**

- **CPU Name:** Intel Xeon Silver 4114
- **CPU Characteristics:** Intel Turbo Boost Technology up to 3.00 GHz
- **CPU MHz:** 2200
- **FPU:** Integrated
- **CPU(s) enabled:** 20 cores, 2 chips, 10 cores/chip, 2 threads/core
- **CPU(s) orderable:** 1.2 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:** 13.75 MB I+D on chip per chip
- **Other Cache:** None
- **Memory:** 192 GB (12 x 16 GB 2Rx8 PC4-2666V-R, running at 2400 MT/s)
- **Disk Subsystem:** 1 x 960 GB SATA SSD
- **Other Hardware:** None
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Results Table

<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>
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<tr>
<td>400.perlbench</td>
<td>258</td>
<td>37.9</td>
<td>256</td>
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<td>43.1</td>
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<td>401.bzip2</td>
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<td>23.3</td>
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<td>403.gcc</td>
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<td>66.8</td>
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<tr>
<td>445.gobmk</td>
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<td>26.9</td>
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<td>383</td>
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<td>456.hmmer</td>
<td>118</td>
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<td></td>
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<tr>
<td>458.sjeng</td>
<td>399</td>
<td>30.3</td>
<td>400</td>
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<td>392</td>
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<tr>
<td>462.libquantum</td>
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<td>3.97</td>
<td>5210</td>
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<td>5230</td>
<td>3.97</td>
<td>5220</td>
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<tr>
<td>464.h264ref</td>
<td>403</td>
<td>55.0</td>
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<td></td>
<td>403</td>
<td>55.0</td>
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<tr>
<td>471.omnetpp</td>
<td>252</td>
<td>24.8</td>
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<td>24.8</td>
<td>263</td>
<td>23.8</td>
<td>197</td>
<td>31.7</td>
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<tr>
<td>473.astar</td>
<td>225</td>
<td>31.3</td>
<td>224</td>
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<td>31.3</td>
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<td>483.xalancbmk</td>
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<td>63.3</td>
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<td>64.7</td>
<td></td>
<td></td>
<td>107</td>
<td>64.8</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-u8yg Mon Jun  5 14:17:01 2017

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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 4114 CPU @ 2.20GHz  
2 "physical id"s (chips)  
40 "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 : 10  
siblings : 20  
physical 0: cores 0 1 2 3 4 8 9 10 11 12  
physical 1: cores 0 1 2 3 4 8 9 10 11 12  
cache size : 14080 KB

From /proc/meminfo  
MemTotal: 196687636 kB  
HugePages_Total: 0  
Hugepagesize: 2048 kB

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:  
Linux linux-u8yg 4.4.16-56-default #1 SMP Mon Aug 8 14:24:26 UTC 2016  
(5b281a8) x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Jun 5 14:10

SPEC is set to: /root/cpu2006-1.2_ic17u3  
Filesystem Type Size Used Avail Use% Mounted on  
/dev/sda1 btrfs 921G 230G 688G 26% /

Additional information from dmidecode:

Warning: Use caution when you interpret this section. The 'dmidecode' program
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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. 0.3.9 04/26/2017
Memory:
12x 00AD00B300AD HMA82GR7AFR8N-VK 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 = "20"

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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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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### 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.xalancbmk: `-D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LINUX`

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### 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) -unroll4`
- 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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### 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`

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You can also download the XML flags sources by saving the following links:


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