### Dell Inc.

**PowerEdge R440 (Intel Xeon Silver 4116, 2.10 GHz)**

<table>
<thead>
<tr>
<th>SPECint®2006</th>
<th>61.9</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECint_base2006</td>
<td>59.1</td>
</tr>
</tbody>
</table>

**CPU2006 license:** 55  
**Test date:** Jul-2017  
**Hardware Availability:** Sep-2017

**Test sponsor:** Dell Inc.  
**Tested by:** Dell Inc.  
**Software Availability:** Apr-2017

### Hardware

<table>
<thead>
<tr>
<th>Name</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name</td>
<td>Intel Xeon Silver 4116</td>
</tr>
<tr>
<td>CPU Characteristics</td>
<td>Intel Turbo Boost Technology up to 3.00 GHz</td>
</tr>
<tr>
<td>CPU MHz</td>
<td>2100</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 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>16.5 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 1 TB SATA 7200 RPM</td>
</tr>
<tr>
<td>Other Hardware</td>
<td>None</td>
</tr>
</tbody>
</table>

### Software

<table>
<thead>
<tr>
<th>Name</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating System</td>
<td>SUSE Linux Enterprise Server 12 SP2</td>
</tr>
<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>xfs</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>
Dell Inc.

PowerEdge R440 (Intel Xeon Silver 4116, 2.10 GHz)

SPECint2006 = 61.9
SPECint_base2006 = 59.1

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

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>400.perlbench</td>
<td>256</td>
<td>38.1</td>
<td>257</td>
<td>38.0</td>
<td>257</td>
<td>38.0</td>
<td>226</td>
</tr>
<tr>
<td>401.bzip2</td>
<td>416</td>
<td>23.2</td>
<td>417</td>
<td>23.2</td>
<td>415</td>
<td>23.2</td>
<td>412</td>
</tr>
<tr>
<td>403.gcc</td>
<td>277</td>
<td>29.1</td>
<td>278</td>
<td>29.0</td>
<td>277</td>
<td>29.1</td>
<td>273</td>
</tr>
<tr>
<td>429.mcf</td>
<td>389</td>
<td>67.2</td>
<td>389</td>
<td>66.8</td>
<td>389</td>
<td>66.1</td>
<td>384</td>
</tr>
<tr>
<td>445.gobmk</td>
<td>136</td>
<td>67.2</td>
<td>136</td>
<td>66.8</td>
<td>138</td>
<td>66.1</td>
<td>136</td>
</tr>
<tr>
<td>456.hmmer</td>
<td>399</td>
<td>79.2</td>
<td>399</td>
<td>79.2</td>
<td>399</td>
<td>79.2</td>
<td>391</td>
</tr>
<tr>
<td>462.libquantum</td>
<td>3.93</td>
<td>5270</td>
<td>3.94</td>
<td>5260</td>
<td>3.93</td>
<td>5270</td>
<td>3.93</td>
</tr>
<tr>
<td>464.h264ref</td>
<td>393</td>
<td>56.3</td>
<td>393</td>
<td>56.2</td>
<td>394</td>
<td>56.1</td>
<td>393</td>
</tr>
<tr>
<td>471.omnetpp</td>
<td>238</td>
<td>26.2</td>
<td>237</td>
<td>26.4</td>
<td>239</td>
<td>26.2</td>
<td>179</td>
</tr>
<tr>
<td>473.astar</td>
<td>223</td>
<td>31.4</td>
<td>222</td>
<td>31.6</td>
<td>222</td>
<td>31.6</td>
<td>222</td>
</tr>
<tr>
<td>483.xalancbmk</td>
<td>104</td>
<td>66.6</td>
<td>103</td>
<td>67.0</td>
<td>103</td>
<td>67.1</td>
<td>93.8</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 Power Management disabled
  - Sysinfo program /root/cpu2006-1.2_ic17u3/config/sysinfo.rev6993
  - Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
  - running on linux-vw3y Fri Jul 28 01:43:01 2017

Continued on next page
Dell Inc.  
PowerEdge R440 (Intel Xeon Silver 4116, 2.10 GHz)  

**SPECint2006 = 61.9**  
**SPECint_base2006 = 59.1**

### 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 4116 CPU @ 2.10GHz
- **2 "physical id"s (chips)**
- **48 "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 : 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 : 16896 KB

From `/proc/meminfo`

- **MemTotal**: 196684112 kB
- **HugePages_Total**: 0
- **Hugepagesize**: 2048 kB

/```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 Jul 28 01:42

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

<table>
<thead>
<tr>
<th>Filesystem</th>
<th>Type</th>
<th>Size</th>
<th>Used</th>
<th>Avail</th>
<th>Use%</th>
<th>Mounted on</th>
</tr>
</thead>
<tbody>
<tr>
<td>/dev/sda3</td>
<td>xfs</td>
<td>923G</td>
<td>9.1G</td>
<td>914G</td>
<td>1%</td>
<td></td>
</tr>
</tbody>
</table>

Continued on next page
SPEC CINT2006 Result

Dell Inc.
PowerEdge R440 (Intel Xeon Silver 4116, 2.10 GHz)

SPECint2006 = 61.9
SPECint_base2006 = 59.1

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

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

Platform Notes (Continued)

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. 0.4.2 07/21/2017
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 = "24"

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.
Files system 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

Continued on next page
## SPEC CINT2006 Result

**Dell Inc.**

**PowerEdge R440 (Intel Xeon Silver 4116, 2.10 GHz)**

| SPECint2006 | 61.9 |
| SPECint_base2006 | 59.1 |

**CPU2006 license:** 55  
**Test sponsor:** Dell Inc.  
**Tested by:** Dell Inc.  
**Test date:** Jul-2017  
**Hardware Availability:** Sep-2017  
**Software Availability:** Apr-2017

### Base Portability Flags (Continued)

- 464.h264ref: -DSPEC_CPU_LP64
- 471.omnetpp: -DSPEC_CPU_LP64
- 473.astar: -DSPEC_CPU_LP64
- 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
Dell Inc.  
PowerEdge R440 (Intel Xeon Silver 4116, 2.10 GHz)  

**SPECint2006 =** 61.9  
**SPECint_base2006 =** 59.1

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

**Test date:** Jul-2017  
**Hardware Availability:** Sep-2017  
**Software Availability:** Apr-2017

### Peak Portability Flags (Continued)

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
Dell Inc. 

PowerEdge R440 (Intel Xeon Silver 4116, 2.10 GHz) 

SPECint2006 = 61.9  
SPECint_base2006 = 59.1

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

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

Peak Optimization Flags (Continued)
473.astar: -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

SPEC and SPECint are registered trademarks of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

For questions about this result, please contact the tester. 
For other inquiries, please contact webmaster@spec.org.

Tested with SPEC CPU2006 v1.2. 
Originally published on 19 September 2017.