## SPEC® CFP2006 Result

### Dell Inc.

**PowerEdge R630 (Intel Xeon E5-2699 v4, 2.20 GHz)**

<table>
<thead>
<tr>
<th>SPECfp®2006</th>
<th>122</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECfp_base2006</td>
<td>115</td>
</tr>
</tbody>
</table>

**CPU2006 license:** 55  
**Test date:** Mar-2016  
**Test sponsor:** Dell Inc.  
**Hardware Availability:** Mar-2016  
**Tested by:** Dell Inc.  
**Software Availability:** Mar-2016

### Hardware

<table>
<thead>
<tr>
<th>Component</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CPU Name:</strong></td>
<td>Intel Xeon E5-2699 v4</td>
</tr>
<tr>
<td><strong>CPU Characteristics:</strong></td>
<td>Intel Turbo Boost Technology up to 3.60 GHz</td>
</tr>
<tr>
<td><strong>CPU MHz:</strong></td>
<td>2200</td>
</tr>
<tr>
<td><strong>FPU:</strong></td>
<td>Integrated</td>
</tr>
<tr>
<td><strong>CPU(s) enabled:</strong></td>
<td>44 cores, 2 chips, 22 cores/chip, 2 threads/core</td>
</tr>
<tr>
<td><strong>CPU(s) orderable:</strong></td>
<td>1.2 chip</td>
</tr>
<tr>
<td><strong>Primary Cache:</strong></td>
<td>32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td><strong>Secondary Cache:</strong></td>
<td>256 KB I+D on chip per core</td>
</tr>
</tbody>
</table>

### Software

<table>
<thead>
<tr>
<th>Component</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Operating System:</strong></td>
<td>SUSE Linux Enterprise Server 12 SP1 3.12.49-11-default</td>
</tr>
<tr>
<td><strong>Compiler:</strong></td>
<td>C/C++: Version 16.0.0.101 of Intel C++ Studio XE for Linux; Fortran: Version 16.0.0.101 of Intel Fortran Studio XE for Linux</td>
</tr>
<tr>
<td><strong>Auto Parallel:</strong></td>
<td>Yes</td>
</tr>
<tr>
<td><strong>File System:</strong></td>
<td>xfs</td>
</tr>
<tr>
<td><strong>System State:</strong></td>
<td>Run level 3 (multi-user)</td>
</tr>
</tbody>
</table>

![SPECfp2006 Chart]

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**Continued on next page**
Dell Inc.

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SPEC CFP2006 Result

Dell Inc.

CPU2006 license: 55
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L3 Cache: 55 MB I+D on chip per chip
Other Cache: None
Memory: 512 GB (16 x 32 GB 2Rx4 PC4-2400T-R)
Disk Subsystem: 1 x 120 GB SATA SSD
Other Hardware: None

Base Pointers: 64-bit
Peak Pointers: 32/64-bit
Other Software: None

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>Seconds</th>
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<td>410.bwaves</td>
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<tr>
<td>416.gamepp</td>
<td>520</td>
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<td>435.gromacs</td>
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<td>68.2</td>
<td>284</td>
<td>68.6</td>
<td><strong>285</strong></td>
<td>68.3</td>
</tr>
</tbody>
</table>

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

Operating System Notes

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

Platform Notes

BIOS settings:
Snoop Mode set to Opportunistic Snoop Broadcast
Virtualization Technology disabled
CPU Power Management set to Maximum Performance
Memory Patrol Scrub disabled
C states set to Autonomously
Energy Efficient Policy set to Performance
Energy Efficient Turbo disabled
C1E disabled
Uncore Frequency set to Dynamic
Dell Inc.  
PowerEdge R630 (Intel Xeon E5-2699 v4, 2.20 GHz)  

**SPEC CFP2006 Result**

<table>
<thead>
<tr>
<th>SPECfp2006</th>
<th>SPECfp_base2006</th>
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<tbody>
<tr>
<td>122</td>
<td>115</td>
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**CPU2006 license:** 55  
**Test date:** Mar-2016  
**Test sponsor:** Dell Inc.  
**Hardware Availability:** Mar-2016  
**Tested by:** Dell Inc.  
**Software Availability:** Mar-2016

---

**Platform Notes (Continued)**

Sysinfo program /root/cpu2006-1.2/config/sysinfo.rev6914  
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1  
running on linux-344q Thu Mar 17 20:30:59 2016

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) CPU E5-2699 v4 @ 2.20GHz  
2 "physical id"s (chips)  
88 "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 : 22  
siblings : 44  
physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27 28  
physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27 28  

cache size : 56320 KB

From /proc/meminfo  
MemTotal: 529333384 kB  
HugePages_Total: 0  
Hugepagesize: 2048 kB

/usr/bin/lsb_release -d  
SUSE Linux Enterprise Server 12 SP1

From /etc/*release* /etc/*version*  
SuSE-release:  
SUSE Linux Enterprise Server 12 (x86_64)  
VERSION = 12  
PATCHLEVEL = 1  
# 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-SP1"  
VERSION_ID="12.1"  
PRETTY_NAME="SUSE Linux Enterprise Server 12 SP1"  
ID=sles  
ANSI_COLOR="0;32"  
CPE_NAME=cpe:/o:suse:sles:12:sp1

uname -a:  
(8d714a0) x86_64 x86_64 x86_64 GNU/Linux

Continued on next page
**SPEC CFP2006 Result**

**Dell Inc.**

PowerEdge R630 (Intel Xeon E5-2699 v4, 2.20 GHz)

**SPECfp2006 = 122**

**SPECfp_base2006 = 115**

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<th>CPU2006 license: 55</th>
<th>Test date:</th>
<th>Mar-2016</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
<tr>
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<td>Software Availability:</td>
<td>Mar-2016</td>
</tr>
</tbody>
</table>

**Platform Notes (Continued)**

run-level 3 Mar 17 15:43

SPEC is set to: /root/cpu2006-1.2

Filesystem Type Size Used Avail Use% Mounted on
/dev/sda2 xfs 104G 9.1G 95G 9% /

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. 2.0.1 02/12/2016
Memory: 16x 00CE00B300CE M393A4K40BB1-CRC 32 GB 2 rank 2400 MHz
8x 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,compact,1,0"
LD_LIBRARY_PATH = "/root/cpu2006-1.2/libs/32:/root/cpu2006-1.2/libs/64:/root/cpu2006-1.2/sh"
OMP_NUM_THREADS = "44"

Binaries compiled on a system with 1x Intel Core i5-4670K CPU + 32GB memory using RedHat EL 7.1
Transparent Huge Pages enabled with:
echo always > /sys/kernel/mm/transparent_hugepage/enabled

**Base Compiler Invocation**

C benchmarks:
icc -m64

C++ benchmarks:
icpc -m64

Fortran benchmarks:
ifort -m64

Benchmarks using both Fortran and C:
icc -m64 ifort -m64
## Base Portability Flags

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Flags</th>
</tr>
</thead>
<tbody>
<tr>
<td>410.bwaves</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>416.gamess</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>433.milc</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>434.zeusmp</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>435.gromacs</td>
<td>-DSPEC_CPU_LP64 --nofor_main</td>
</tr>
<tr>
<td>436.cactusADM</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
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<td>453.povray</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>454.calculix</td>
<td>-DSPEC_CPU_LP64 --nofor_main</td>
</tr>
<tr>
<td>459.GemsFDTD</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>465.tonto</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>470.lbm</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>481.wrf</td>
<td>-DSPEC_CPU_LP64 --DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LINUX</td>
</tr>
<tr>
<td>482.sphinx3</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
</tbody>
</table>

## Base Optimization Flags

### C benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -opt-prefetch -ansi-alias

### C++ benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -ansi-alias

### Fortran benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -opt-prefetch

### Benchmarks using both Fortran and C:
-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -opt-prefetch -ansi-alias

## Peak Compiler Invocation

### C benchmarks:
icc -m64

### C++ benchmarks:
icpc -m64

### Fortran benchmarks:
ifort -m64
Peak Compiler Invocation (Continued)

Benchmarks using both Fortran and C:

```
icc  -m64 ifort  -m64
```

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:

- 433.milc: basepeak = yes
- 470.lbm: basepeak = yes
- 482.sphinx3: basepeak = yes

C++ benchmarks:

- 444.namd: -xCORE-AVX2(pass 2)  -prof-gen:threadsafe(pass 1)
  -ipo(pass 2)  -O3(pass 2)  -no-prec-div(pass 2)
  -par-num-threads=1(pass 1)  -prof-use(pass 2)  -fno-alias
  -auto-ilk32
- 447.dealII: basepeak = yes
- 450.soplex: basepeak = yes
- 453.povray: -xCORE-AVX2(pass 2)  -prof-gen:threadsafe(pass 1)
  -ipo(pass 2)  -O3(pass 2)  -no-prec-div(pass 2)
  -par-num-threads=1(pass 1)  -prof-use(pass 2)  -unroll4
  -ansi-alias

Fortran benchmarks:

- 410.bwaves: basepeak = yes
- 416.gamess: -xCORE-AVX2(pass 2)  -prof-gen:threadsafe(pass 1)
  -ipo(pass 2)  -O3(pass 2)  -no-prec-div(pass 2)
  -par-num-threads=1(pass 1)  -prof-use(pass 2)  -unroll2
  -inline-level=0  -scalar-rep-
- 434.zeusmp: basepeak = yes
- 437.leslie3d: basepeak = yes
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Peak Optimization Flags (Continued)

459.GemsFDTD: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)
           -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)
           -par-num-threads=1(pass 1) -prof-use(pass 2) -unroll2
           -inline-level=0 -opt-prefetch -parallel

465.tonto: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)
           -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)
           -par-num-threads=1(pass 1) -prof-use(pass 2) -inline-calloc
           -opt-malloc-options=3 -auto -unroll4

Benchmarks using both Fortran and C:

435.gromacs: basepeak = yes
436.cactusADM: basepeak = yes
454.calculix: -xCORE-AVX2 -ipo -O3 -no-prec-div -auto-ilp32 -ansi-alias
  basepeak = yes
481.wrf: basepeak = yes

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2006/flags/Intel-ic16.0-official-linux64.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/Intel-ic16.0-official-linux64.xml
http://www.spec.org/cpu2006/flags/Dell-Platform-Settings-V1.2-revD.20151006.xml

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

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