### SPEC® CFP2006 Result

**Dell Inc.**

PowerEdge T630 (Intel Xeon E5-2699 v4, 2.20 GHz)

<table>
<thead>
<tr>
<th>SPECfp®2006 =</th>
<th>123</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECfp_base2006 =</td>
<td>116</td>
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</tbody>
</table>

**CPU2006 license:** 55  
**Test date:** Dec-2015  
**Test sponsor:** Dell Inc.  
**Tested by:** Dell Inc.  
**Hardware Availability:** Mar-2016  
**Software Availability:** Mar-2016

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>410.bwaves</td>
<td>37.5</td>
</tr>
<tr>
<td>416.gamess</td>
<td>77.2</td>
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<tr>
<td>433.milc</td>
<td>209</td>
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<td>434.zeusmp</td>
<td>45.6</td>
</tr>
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<td>435.gromacs</td>
<td>916</td>
</tr>
<tr>
<td>436.cactusADM</td>
<td>379</td>
</tr>
<tr>
<td>437.leslie3d</td>
<td>32.6</td>
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<tr>
<td>444.namd</td>
<td>31.6</td>
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<tr>
<td>447.dealII</td>
<td>67.6</td>
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<tr>
<td>450.soplex</td>
<td>63.6</td>
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<tr>
<td>453.povray</td>
<td>60.6</td>
</tr>
<tr>
<td>454.calculix</td>
<td>52.6</td>
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<tr>
<td>459.GemsFDTD</td>
<td>58.6</td>
</tr>
<tr>
<td>465.tonto</td>
<td>40.8</td>
</tr>
<tr>
<td>470.lbm</td>
<td>121</td>
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<tr>
<td>481.wrf</td>
<td>68.9</td>
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<tr>
<td>482.sphinx3</td>
<td>916</td>
</tr>
</tbody>
</table>

**Hardware**

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

**Software**

<table>
<thead>
<tr>
<th>Operating System:</th>
<th>Red Hat Enterprise Linux Server release 7.1 (Maipo)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compiler:</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>Auto Parallel:</td>
<td>Yes</td>
</tr>
<tr>
<td>File System:</td>
<td>xfs</td>
</tr>
</tbody>
</table>

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Dell Inc.

PowerEdge T630 (Intel Xeon E5-2699 v4, 2.20 GHz)

SPECfp2006 = 123
SPECfp_base2006 = 116

CPU2006 license: 55
Test sponsor: Dell Inc.
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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 300 GB 15000 RPM SAS
Other Hardware: None

System State: Run level 3 (multi-user)
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>
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<tbody>
<tr>
<td>Base</td>
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<tr>
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<tr>
<td>481.wrf</td>
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<tr>
<td>482.sphinx3</td>
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<td>69.0</td>
<td>287</td>
<td>68.0</td>
<td>283</td>
<td>68.9</td>
<td>283</td>
<td>68.9</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
System Profile set to Performance
Memory Patrol Scrub disabled
C1E enabled
Cstates enabled
Sysinfo program /root/cpu2006-1.2/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
running on localhost.localdomain Wed Dec 2 14:18:08 2015
Continued on next page
Dell Inc.

PowerEdge T630 (Intel Xeon E5-2699 v4, 2.20 GHz)

SPECfp2006 = 123
SPECfp_base2006 = 116

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

Test date: Dec-2015
Hardware Availability: Mar-2016
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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) 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: 528083420 kB
  HugePages_Total: 0
  Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
  os-release:
    NAME="Red Hat Enterprise Linux Server"
    VERSION="7.1 (Maipo)"
    ID="rhel"
    ID_LIKE="fedora"
    VERSION_ID="7.1"
    PRETTY_NAME="Red Hat Enterprise Linux Server 7.1 (Maipo)"
    ANSI_COLOR="0;31"
    CPE_NAME=cpe:/o:redhat:enterprise_linux:7.1:GA:server
  redhat-release: Red Hat Enterprise Linux Server release 7.1 (Maipo)
  system-release: Red Hat Enterprise Linux Server release 7.1 (Maipo)

  uname -a:
    Linux localhost.localdomain 3.10.0-229.el7.x86_64 #1 SMP Thu Jan 29 18:37:38 EST 2015 x86_64 x86_64 x86_64 GNU/Linux

  run-level 3 Dec 2 09:31 last=5

  SPEC is set to: /root/cpu2006-1.2
  Filesystem Type Size Used Avail Use% Mounted on
  /dev/sda2 xfs 240G 29G 211G 13% /

  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
Continued on next page
## Dell Inc. PowerEdge T630 (Intel Xeon E5-2699 v4, 2.20 GHz)

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### Platform Notes (Continued)

"determined", but the intent may not be met, as there are frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.

BIOS Dell Inc. 1.7.10 11/22/2015  
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

410.bwaves: -DSPEC_CPU_LP64  
416.gamess: -DSPEC_CPU_LP64  
433.milc: -DSPEC_CPU_LP64  
434.zeusmp: -DSPEC_CPU_LP64  
435.gromacs: -DSPEC_CPU_LP64 -nofor_main  
436.cactusADM: -DSPEC_CPU_LP64 -nofor_main  
437.leslie3d: -DSPEC_CPU_LP64  
444.namd: -DSPEC_CPU_LP64
SPEC CFP2006 Result

**Dell Inc.**

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**SPECfp2006 = 123**

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**Base Portability Flags (Continued)**

- 447.dealII: DSPEC_CPU_LP64
- 450.soplex: DSPEC_CPU_LP64
- 453.povray: DSPEC_CPU_LP64
- 454.calculix: DSPEC_CPU_LP64 -nofor_main
- 459.GemsFDTD: DSPEC_CPU_LP64
- 465.tonto: DSPEC_CPU_LP64
- 470.lbm: DSPEC_CPU_LP64
- 481.wrf: DSPEC_CPU_LP64 -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LINUX
- 482.sphinx3: DSPEC_CPU_LP64

---

**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

Benchmarks using both Fortran and C:
icc -m64 ifort -m64

---

**Peak Portability Flags**

Same as Base Portability Flags
### Dell Inc.

**PowerEdge T630 (Intel Xeon E5-2699 v4, 2.20 GHz)**

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- **SPECfp_base2006 =** 116

**CPU2006 license:** 55  
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**Tested by:** Dell Inc.  
**Test date:** Dec-2015  
**Hardware Availability:** Mar-2016  
**Software Availability:** Mar-2016

### 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-ilp32
- 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
- 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:**

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Peak Optimization Flags (Continued)

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

Tested with SPEC CPU2006 v1.2.  
Report generated on Tue Apr 5 14:54:48 2016 by SPEC CPU2006 PS/PDF formatter v6932.  
Originally published on 5 April 2016.