### SPEC® CFP2006 Result

**Dell Inc.**

PowerEdge R730xd (Intel Xeon E5-2697A v4, 3.10 GHz)

### CPU2006 license:
55

### Test sponsor:
Dell Inc.

### Tested by:
Dell Inc.

### SPECfp®2006 = 123

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Specfp_base2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>410.bwaves</td>
<td>41.4</td>
</tr>
<tr>
<td>416.gamess</td>
<td>38.3</td>
</tr>
<tr>
<td>433.milc</td>
<td>71.7</td>
</tr>
<tr>
<td>434.zeusmp</td>
<td>204</td>
</tr>
<tr>
<td>435.gromacs</td>
<td>52.4</td>
</tr>
<tr>
<td>436.cactusADM</td>
<td>336</td>
</tr>
<tr>
<td>437.leslie3d</td>
<td></td>
</tr>
<tr>
<td>444.namd</td>
<td>32.5</td>
</tr>
<tr>
<td>447.dealII</td>
<td>64.8</td>
</tr>
<tr>
<td>450.soplex</td>
<td>48.5</td>
</tr>
<tr>
<td>453.povray</td>
<td>62.6</td>
</tr>
<tr>
<td>454.calculix</td>
<td>57.6</td>
</tr>
<tr>
<td>459.GemsFDTD</td>
<td>57.2</td>
</tr>
<tr>
<td>465.tonto</td>
<td>52.5</td>
</tr>
<tr>
<td>470.lbm</td>
<td>44.3</td>
</tr>
<tr>
<td>481.wrf</td>
<td>119</td>
</tr>
<tr>
<td>482.sphinx3</td>
<td>76.1</td>
</tr>
</tbody>
</table>

**Hardware**

- **CPU Name:** Intel Xeon E5-2697A v4
- **CPU Characteristics:** Intel Turbo Boost Technology up to 3.60 GHz
- **CPU MHz:** 3100
- **FPU:** Integrated
- **CPU(s) enabled:** 32 cores, 2 chips, 16 cores/chip
- **CPU(s) orderable:** 1,2 chips
- **Primary Cache:** 32 KB I + 32 KB D on chip per core
- **Secondary Cache:** 256 KB I+D on chip per core

### Software

- **Operating System:** SUSE Linux Enterprise Server 12 3.12.28-4-default
- **Compiler:** C/C++: Version 17.0.0.098 of Intel C/C++ Compiler for Linux; Fortran: Version 17.0.0.098 of Intel Fortran Compiler for Linux
- **Auto Parallel:** Yes
- **File System:** ext4
- **System State:** Run level 3 (multi-user)

---

Continued on next page
Dell Inc.

PowerEdge R730xd (Intel Xeon E5-2697A v4, 3.10 GHz)  

**SPEC CFP2006 Result**

**SPECfp2006** = 123  
**SPECfp_base2006** = 118

---

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

Test date: Feb-2017  
Hardware Availability: Mar-2016  
Software Availability: Nov-2016

---

**L3 Cache:** 40 MB I+D on chip per chip  
**Other Cache:** None  
**Memory:** 256 GB (16 x 16 GB 2Rx8 PC4-2400T-R)  
**Disk Subsystem:** 2 x 2000 GB 7200 RPM SAS RAID 0  
**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>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>410.bwaves</td>
<td>18.9</td>
<td>718</td>
<td>18.9</td>
<td>721</td>
<td>18.9</td>
<td>720</td>
<td>18.9</td>
<td>720</td>
</tr>
<tr>
<td>416.gamess</td>
<td>511</td>
<td>38.3</td>
<td>511</td>
<td>38.3</td>
<td>512</td>
<td>38.2</td>
<td>473</td>
<td>41.4</td>
</tr>
<tr>
<td>433.milc</td>
<td>128</td>
<td>71.7</td>
<td>129</td>
<td>71.0</td>
<td>127</td>
<td>72.1</td>
<td>128</td>
<td>71.7</td>
</tr>
<tr>
<td>434.zeusmp</td>
<td>44.6</td>
<td>204</td>
<td>44.6</td>
<td>204</td>
<td>44.3</td>
<td>205</td>
<td>44.6</td>
<td>204</td>
</tr>
<tr>
<td>435.gromacs</td>
<td>136</td>
<td>52.4</td>
<td>137</td>
<td>52.3</td>
<td>136</td>
<td>52.5</td>
<td>136</td>
<td>52.4</td>
</tr>
<tr>
<td>436.cactusADM</td>
<td>12.0</td>
<td>998</td>
<td>12.0</td>
<td>997</td>
<td>11.9</td>
<td>1010</td>
<td>12.0</td>
<td>998</td>
</tr>
<tr>
<td>437.leslie3d</td>
<td>28.0</td>
<td>336</td>
<td>28.1</td>
<td>334</td>
<td>27.1</td>
<td>346</td>
<td>28.0</td>
<td>336</td>
</tr>
<tr>
<td>444.namd</td>
<td>253</td>
<td>31.7</td>
<td>253</td>
<td>31.7</td>
<td>253</td>
<td>31.7</td>
<td>247</td>
<td>32.5</td>
</tr>
<tr>
<td>447.dealII</td>
<td>176</td>
<td>64.8</td>
<td>178</td>
<td>64.2</td>
<td>177</td>
<td>64.8</td>
<td>176</td>
<td>64.8</td>
</tr>
<tr>
<td>450.soplex</td>
<td>172</td>
<td>48.5</td>
<td>173</td>
<td>48.3</td>
<td>171</td>
<td>48.8</td>
<td>172</td>
<td>48.5</td>
</tr>
<tr>
<td>453.povray</td>
<td>102</td>
<td>52.1</td>
<td>107</td>
<td>49.6</td>
<td>105</td>
<td>50.8</td>
<td>85.0</td>
<td>62.6</td>
</tr>
<tr>
<td>454.calculix</td>
<td>144</td>
<td>57.2</td>
<td>144</td>
<td>57.2</td>
<td>145</td>
<td>57.1</td>
<td>143</td>
<td>57.6</td>
</tr>
<tr>
<td>459.GemsFDTD</td>
<td>46.3</td>
<td>229</td>
<td>48.3</td>
<td>220</td>
<td>46.2</td>
<td>229</td>
<td>38.7</td>
<td>274</td>
</tr>
<tr>
<td>465.tonto</td>
<td>227</td>
<td>43.4</td>
<td>222</td>
<td>44.3</td>
<td>220</td>
<td>44.6</td>
<td>187</td>
<td>52.5</td>
</tr>
<tr>
<td>470.lbm</td>
<td>14.7</td>
<td>933</td>
<td>14.7</td>
<td>936</td>
<td>14.7</td>
<td>933</td>
<td>14.7</td>
<td>933</td>
</tr>
<tr>
<td>481.wrf</td>
<td>93.7</td>
<td>119</td>
<td>93.6</td>
<td>119</td>
<td>93.5</td>
<td>120</td>
<td>93.7</td>
<td>119</td>
</tr>
<tr>
<td>482.sphinx3</td>
<td>256</td>
<td>76.1</td>
<td>256</td>
<td>76.1</td>
<td>256</td>
<td>76.1</td>
<td>256</td>
<td>76.1</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 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

---

Continued on next page

---

Standard Performance Evaluation Corporation  
info@spec.org  
http://www.spec.org/
Dell Inc.
PowerEdge R730xd (Intel Xeon E5-2697A v4, 3.10 GHz)

**SPECfp2006 =** 123
**SPECfp_base2006 =** 118

CPU2006 license: 55
Test sponsor: Dell Inc.
Tested by: Dell Inc.
Test date: Feb-2017
Hardware Availability: Mar-2016
Software Availability: Nov-2016

**Platform Notes (Continued)**

Memory Patrol Scrub disabled
Logical Processor disabled
Sysinfo program /root/previous-cpu2006-1.2/config/sysinfo.rev6993
Revision 6993 of 2015-11-06 (b5e8d4eb51ed28d7f98696cbe290c1)
running on linux-0171 Tue Feb 7 18:34:21 2017

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 E5-2697A v4 @ 2.60GHz
  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 : 16
  siblings : 16
  physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
  physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
cache size : 40960 KB

From /proc/meminfo
MemTotal: 264567484 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

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

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

uname -a:
Linux linux-0171 3.12.28-4-default #1 SMP Thu Sep 25 17:02:34 UTC 2014
(9879bd4) x86_64 x86_64 x86_64 GNU/Linux

Continued on next page
SPEC CFP2006 Result

Dell Inc.
PowerEdge R730xd (Intel Xeon E5-2697A v4, 3.10 GHz)

SPECfp2006 = 123
SPECfp_base2006 = 118

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

Test date: Feb-2017
Hardware Availability: Mar-2016
Software Availability: Nov-2016

Platform Notes (Continued)

run-level 3 Feb 7 13:33

SPEC is set to: /root/previous-cpu2006-1.2
Filesystem  Type Size Used Avail Use% Mounted on
/dev/sda2  ext4  246G   19G  226G   8% /

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. 2.3.4 11/08/2016
Memory:
7x 00AD063200AD HMA82GR7MFR8N-UH 16 GB 2 rank 2400 MHz
9x 00CE00B300CE M393A2K43BB1-CRC 16 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,scatter"
LD_LIBRARY_PATH = "*/root/previous-cpu2006-1.2/libs/32:/root/previous-cpu2006-1.2/libs/64:/root/previous-cpu2006-1.2/sh10.2"
OMP_NUM_THREADS = "20"
The Dell PowerEdge R730 and the PowerEdge R730xd models are electronically equivalent. The results have been measured on a Dell PowerEdge R730xd model.
Binaries compiled on a system with 1x Intel Core i7-4790K CPU + 32GB RAM memory using Redhat Enterprise Linux 7.2
Transparent Huge Pages enabled with:
echo never > /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
SPECFP2006 Result

Dell Inc.

PowerEdge R730xd (Intel Xeon E5-2697A v4, 3.10 GHz)

SPECfp2006 = 123
SPECfp_base2006 = 118

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

Test date: Feb-2017
Hardware Availability: Mar-2016
Software Availability: Nov-2016

Base Portability Flags

410.bwaves: -DSPEC_CPU_LP64
416.gamest: -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
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 -03 -no-prec-div -parallel -qopt-prefetch

C++ benchmarks:
-xCORE-AVX2 -ipo -03 -no-prec-div -qopt-prefetch

Fortran benchmarks:
-xCORE-AVX2 -ipo -03 -no-prec-div -parallel -qopt-prefetch

Benchmarks using both Fortran and C:
-xCORE-AVX2 -ipo -03 -no-prec-div -parallel -qopt-prefetch

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

Peak Optimization Flags

C benchmarks:

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

C++ benchmarks:

444.namd: -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) -fno-alias -auto-ilp32

447.dealII: basepeak = yes
450.soplex: basepeak = yes
453.povray: -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 -ansi-alias

Fortran benchmarks:

410.bwaves: basepeak = yes
416.gamess: -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) -unroll2 -inline-level=0 -scalar-rep-

434.zeusmp: basepeak = yes
437.leslie3d: basepeak = yes
459.GemsFDTD: -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) -unroll2 -inline-level=0 -qopt-prefetch -parallel

465.tonto: -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) -inline-calloc -qopt-malloc-options=3
-auto -unroll4

Continued on next page
Dell Inc.

PowerEdge R730xd (Intel Xeon E5-2697A v4, 3.10 GHz)  

SPECfp2006 = 123  
SPECfp_base2006 = 118

CPU2006 license: 55  
Test sponsor: Dell Inc.  
Tested by: Dell Inc.  
Test date: Feb-2017  
Hardware Availability: Mar-2016  
Software Availability: Nov-2016

Peak Optimization Flags (Continued)

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
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-ic17.0-official-linux64.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.xml

SPEC and SPECfp 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 7 March 2017.