Dell Inc.

PowerEdge FC430 (Intel Xeon E5-2609 v4, 1.70 GHz)

**SPECfp®2006** = 70.0

**SPECfp_base2006** = 67.9

---

**CPU2006 license**: 55
**Test date**: Jul-2016
**Test sponsor**: Dell Inc.
**Tested by**: Dell Inc.
**Hardware Availability**: Jun-2016
**Software Availability**: Nov-2015

---

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>410.bwaves</td>
<td>22.8</td>
</tr>
<tr>
<td>416.gamess</td>
<td>21.3</td>
</tr>
<tr>
<td>433.milc</td>
<td>49.8</td>
</tr>
<tr>
<td>434.zeusmp</td>
<td>142</td>
</tr>
<tr>
<td>435.gromacs</td>
<td>30.8</td>
</tr>
<tr>
<td>436.cactusADM</td>
<td>452</td>
</tr>
<tr>
<td>437.leslie3d</td>
<td>195</td>
</tr>
<tr>
<td>444.namd</td>
<td>15.4</td>
</tr>
<tr>
<td>447.dealII</td>
<td>35.0</td>
</tr>
<tr>
<td>450.soplex</td>
<td>28.6</td>
</tr>
<tr>
<td>453.povray</td>
<td>34.6</td>
</tr>
<tr>
<td>454.calculix</td>
<td>30.4</td>
</tr>
<tr>
<td>459.GemsFDTD</td>
<td>171</td>
</tr>
<tr>
<td>465.tonto</td>
<td>29.8</td>
</tr>
<tr>
<td>470.lbm</td>
<td>26.9</td>
</tr>
<tr>
<td>481.wrf</td>
<td>61.6</td>
</tr>
<tr>
<td>482.sphinx3</td>
<td>50.3</td>
</tr>
</tbody>
</table>

---

**Hardware**

**CPU Name**: Intel Xeon E5-2609 v4
**CPU Characteristics**: 16 cores, 2 chips, 8 cores/chip
**CPU MHz**: 1700
**FPU**: Integrated
**CPU(s) enabled**: 1.2 chip
**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**: Red Hat Enterprise Linux Server release 7.2 (Maipo)
**Compiler**: 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
**Auto Parallel**: Yes
**File System**: xfs

---

Standard Performance Evaluation Corporation
info@spec.org
http://www.spec.org/
<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Seconds</th>
<th>Basix</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Basix</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Basix</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Basix</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>410.bwaves</td>
<td>34.3</td>
<td>396</td>
<td>33.6</td>
<td>405</td>
<td>33.3</td>
<td>408</td>
<td>34.3</td>
<td>396</td>
<td>33.6</td>
<td>405</td>
<td>33.3</td>
<td>408</td>
</tr>
<tr>
<td>416.gamess</td>
<td>921</td>
<td>21.3</td>
<td>919</td>
<td>21.3</td>
<td>919</td>
<td>21.3</td>
<td>860</td>
<td>22.8</td>
<td>862</td>
<td>22.7</td>
<td>860</td>
<td>22.8</td>
</tr>
<tr>
<td>433.milc</td>
<td>185</td>
<td>49.8</td>
<td>185</td>
<td>49.7</td>
<td>184</td>
<td>49.8</td>
<td>185</td>
<td>49.8</td>
<td>185</td>
<td>49.7</td>
<td>185</td>
<td>49.8</td>
</tr>
<tr>
<td>434.zeusmp</td>
<td>63.9</td>
<td>142</td>
<td>64.0</td>
<td>142</td>
<td>63.2</td>
<td>144</td>
<td>63.9</td>
<td>142</td>
<td>64.0</td>
<td>142</td>
<td>63.2</td>
<td>144</td>
</tr>
<tr>
<td>435.gromacs</td>
<td>232</td>
<td>30.8</td>
<td>232</td>
<td>30.8</td>
<td>233</td>
<td>30.7</td>
<td>232</td>
<td>30.8</td>
<td>232</td>
<td>30.8</td>
<td>233</td>
<td>30.7</td>
</tr>
<tr>
<td>436.cactusADM</td>
<td>26.6</td>
<td>449</td>
<td>26.5</td>
<td>452</td>
<td>25.5</td>
<td>469</td>
<td>26.6</td>
<td>449</td>
<td>26.5</td>
<td>452</td>
<td>25.5</td>
<td>469</td>
</tr>
<tr>
<td>437.leslie3d</td>
<td>47.4</td>
<td>198</td>
<td>48.2</td>
<td>195</td>
<td>48.6</td>
<td>193</td>
<td>47.4</td>
<td>198</td>
<td>48.2</td>
<td>195</td>
<td>48.6</td>
<td>193</td>
</tr>
<tr>
<td>444.namd</td>
<td>536</td>
<td>15.0</td>
<td>536</td>
<td>15.0</td>
<td>535</td>
<td>15.0</td>
<td>520</td>
<td>15.4</td>
<td>520</td>
<td>15.4</td>
<td>519</td>
<td>15.4</td>
</tr>
<tr>
<td>447.dealII</td>
<td>327</td>
<td>35.0</td>
<td>327</td>
<td>35.0</td>
<td>328</td>
<td>34.9</td>
<td>327</td>
<td>35.0</td>
<td>327</td>
<td>35.0</td>
<td>328</td>
<td>34.9</td>
</tr>
<tr>
<td>450.soplex</td>
<td>292</td>
<td>28.6</td>
<td>290</td>
<td>28.8</td>
<td>294</td>
<td>28.4</td>
<td>292</td>
<td>28.6</td>
<td>290</td>
<td>28.8</td>
<td>294</td>
<td>28.4</td>
</tr>
<tr>
<td>453.povray</td>
<td>172</td>
<td>31.0</td>
<td>175</td>
<td>30.4</td>
<td>176</td>
<td>30.3</td>
<td>154</td>
<td>34.6</td>
<td>155</td>
<td>34.4</td>
<td>153</td>
<td>34.8</td>
</tr>
<tr>
<td>454.calculix</td>
<td>263</td>
<td>31.3</td>
<td>264</td>
<td>31.3</td>
<td>264</td>
<td>31.3</td>
<td>253</td>
<td>32.6</td>
<td>253</td>
<td>32.6</td>
<td>253</td>
<td>32.5</td>
</tr>
<tr>
<td>459.GemsFDTD</td>
<td>70.1</td>
<td>151</td>
<td>71.3</td>
<td>149</td>
<td>72.7</td>
<td>146</td>
<td>62.2</td>
<td>171</td>
<td>62.2</td>
<td>171</td>
<td>61.3</td>
<td>173</td>
</tr>
<tr>
<td>465.tonto</td>
<td>367</td>
<td>26.8</td>
<td>364</td>
<td>27.0</td>
<td>366</td>
<td>26.9</td>
<td>330</td>
<td>29.8</td>
<td>331</td>
<td>29.7</td>
<td>331</td>
<td>29.8</td>
</tr>
<tr>
<td>470.lbm</td>
<td>28.9</td>
<td>475</td>
<td>27.7</td>
<td>496</td>
<td>28.7</td>
<td>479</td>
<td>28.9</td>
<td>475</td>
<td>27.7</td>
<td>496</td>
<td>28.7</td>
<td>479</td>
</tr>
<tr>
<td>481.wrf</td>
<td>181</td>
<td>61.6</td>
<td>176</td>
<td>63.4</td>
<td>181</td>
<td>61.6</td>
<td>181</td>
<td>61.6</td>
<td>176</td>
<td>63.4</td>
<td>181</td>
<td>61.6</td>
</tr>
<tr>
<td>482.sphinx3</td>
<td>388</td>
<td>50.3</td>
<td>389</td>
<td>50.1</td>
<td>387</td>
<td>50.3</td>
<td>388</td>
<td>50.3</td>
<td>389</td>
<td>50.1</td>
<td>387</td>
<td>50.3</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 Home Snoop
  - Virtualization Technology disabled
  - System Profile set to custom
  - CPU Power Management set to Maximum Performance
  - C States set to Autonomous
  - C1E disabled
  - Energy Efficient Turbo disabled
  - Uncore Frequency set to Dynamic

Continued on next page
Dell Inc.  
PowerEdge FC430 (Intel Xeon E5-2609 v4, 1.70 GHz)  

**SPEC CFP2006 Result**

**SPECfp2006** = 70.0  
**SPECfp_base2006** = 67.9

**CPU2006** license: 55  
**Test date:** Jul-2016  
**Test sponsor:** Dell Inc.  
**Hardware Availability:** Jun-2016  
**Tested by:** Dell Inc.  
**Software Availability:** Nov-2015

---

**Platform Notes (Continued)**

Energy Efficiency Policy set to Performance  
Memory Patrol Scrub disabled  
Sysinfo program /root/cpu2006-1.2/config/sysinfo.rev6914  
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1  
running on localhost.localdomain Thu Jul  7 02:35:35 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 E5-2609 v4@ 1.70GHz  
- 2 "physical id"s (chips)  
- 16 "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 : 8  
  - siblings : 8  
  - physical 0: cores 0 1 2 3 4 5 6 7  
  - physical 1: cores 0 1 2 3 4 5 6 7  
- cache size : 20480 KB

From /proc/meminfo

- MemTotal: 264039396 kB  
- HugePages_Total: 0  
- Hugepagesize: 2048 kB

From /etc/*release*/etc/*version*

- os-release:
  - NAME="Red Hat Enterprise Linux Server"  
  - VERSION="7.2 (Maipo)"  
  - ID="rhel"  
  - ID_LIKE="fedora"  
  - VERSION_ID="7.2"  
  - PRETTY_NAME="Red Hat Enterprise Linux Server 7.2 (Maipo)"  
  - ANSI_COLOR="0;31"  
  - CPE_NAME="cpe:/o:redhat:enterprise_linux:7.2:GA:server"  
  - redhat-release: Red Hat Enterprise Linux Server release 7.2 (Maipo)  
  - system-release: Red Hat Enterprise Linux Server release 7.2 (Maipo)  

uname -a:

- Linux localhost.localdomain 3.10.0-327.el7.x86_64 #1 SMP Thu Oct 29 17:29:29 EDT 2015 x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Jul 6 17:31

SPEC is set to: /root/cpu2006-1.2  
Filesystem Type Size Used Avail Use% Mounted on  
/dev/sda2 xfs 234G 9.8G 225G 5% /

Additional information from dmidecode:

Continued on next page
# SPEC CFP2006 Result

**Dell Inc.**

PowerEdge FC430 (Intel Xeon E5-2609 v4, 1.70 GHz)  

<table>
<thead>
<tr>
<th>SPECfp2006</th>
<th>70.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECfp_base2006</td>
<td>67.9</td>
</tr>
</tbody>
</table>

**CPU2006 license:** 55  
**Test date:** Jul-2016  
**Test sponsor:** Dell Inc.  
**Hardware Availability:** Jun-2016  
**Tested by:** Dell Inc.  
**Software Availability:** Nov-2015

## Platform Notes (Continued)

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. 2.2.1 06/07/2016  
**Memory:**  
8x 00CE00B300CE M393A4K40BB1-CRC 32 GB 2 rank 2400 MHz, configured at 1866 MHz

(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** = "16"

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:**  
```shell  
icc  -m64  
```

**C++ benchmarks:**  
```shell  
icpc  -m64  
```

**Fortran benchmarks:**  
```shell  
ifort  -m64  
```

**Benchmarks using both Fortran and C:**  
```shell  
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`

Continued on next page
Dell Inc. PowerEdge FC430 (Intel Xeon E5-2609 v4, 1.70 GHz) SPECfp2006 = 70.0 SPECfp_base2006 = 67.9

CPU2006 license: 55 Test date: Jul-2016
Test sponsor: Dell Inc. Hardware Availability: Jun-2016
Tested by: Dell Inc. Software Availability: Nov-2015

Base Portability Flags (Continued)

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
463.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
SPEC CFP2006 Result

Dell Inc.
PowerEdge FC430 (Intel Xeon E5-2609 v4, 1.70 GHz)

SPECfp2006 = 70.0
SPECfp_base2006 = 67.9

CPU2006 license: 55
Test sponsor: Dell Inc.
Test date: Jul-2016
Tested by: Dell Inc.
Hardware Availability: Jun-2016
Software Availability: Nov-2015

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-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

Continued on next page
SPEC CFP2006 Result

Dell Inc.
PowerEdge FC430 (Intel Xeon E5-2609 v4, 1.70 GHz)

SPECfp2006 = 70.0
SPECfp_base2006 = 67.9

CPU2006 license: 55
Test date: Jul-2016
Test sponsor: Dell Inc.
Hardware Availability: Jun-2016
Tested by: Dell Inc.
Software Availability: Nov-2015

Peak Optimization Flags (Continued)

465.tonto (continued):
   -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
   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

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 23 August 2016.