# SPEC® CFP2006 Result

## Dell Inc.

PowerEdge R730 (Intel Xeon E5-2609 v4, 1.70 GHz)

| SPECfp®_rate2006 = | 435 |
| SPECfp_rate_base2006 = | 427 |

### Hardware

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<tr>
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<th>Value</th>
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<tbody>
<tr>
<td>CPU Name:</td>
<td>Intel Xeon E5-2609 v4</td>
</tr>
<tr>
<td>CPU Characteristics:</td>
<td></td>
</tr>
<tr>
<td>CPU MHz:</td>
<td>1700</td>
</tr>
<tr>
<td>FPU:</td>
<td>Integrated</td>
</tr>
<tr>
<td>CPU(s) enabled:</td>
<td>16 cores, 2 chips, 8 cores/chip</td>
</tr>
<tr>
<td>CPU(s) orderable:</td>
<td>1.2 chip</td>
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<tr>
<td>Primary Cache:</td>
<td>32 KB I + 32 KB D on chip per core</td>
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<tr>
<td>Secondary Cache:</td>
<td>256 KB I+D on chip per core</td>
</tr>
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</table>

### Software

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
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<tbody>
<tr>
<td>Operating System:</td>
<td>Red Hat Enterprise Linux Server release 7.1 (Maipo) 3.10.0-229.el7.x86_64</td>
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<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>
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<tr>
<td>Auto Parallel:</td>
<td>No</td>
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<tr>
<td>File System:</td>
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Test date: Jan-2016  
Hardware Availability: Mar-2016  
Software Availability: Mar-2016

## Performance Results

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<thead>
<tr>
<th>SPECfpm</th>
<th>Rate 2006</th>
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<tr>
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Dell Inc.

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

Hardware Availability: Mar-2016  
Software Availability: Mar-2016

Continued on next page
Dell Inc.

PowerEdge R730 (Intel Xeon E5-2609 v4, 1.70 GHz)

SPEC CFP2006 Result

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SPECfp_rate2006 = 435
SPECfp_rate_base2006 = 427

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

L3 Cache: 20 MB I+D on chip per chip
Other Cache: None
Memory: 512 GB (16 x 32 GB 2Rx4 PC4-2400T-R, running at 1866 MHz)
Disk Subsystem: 1 x 120 GB SATA SSD
Other Hardware: None

System State: Run level 3 (multi-user)
Base Pointers: 32/64-bit
Peak Pointers: 32/64-bit
Other Software: None

Results Table

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<tr>
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<th>Ratio</th>
<th>Base Seconds</th>
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</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:
Snoop Mode set to Opportunistic Snoop Broadcast
Virtualization Technology disabled

Continued on next page

Standard Performance Evaluation Corporation
info@spec.org
http://www.spec.org/
Dell Inc.
PowerEdge R730 (Intel Xeon E5-2609 v4, 1.70 GHz)

SPECfp_rate2006 = 435
SPECfp_rate_base2006 = 427

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

Platform Notes (Continued)

System Profile set to Performance
Memory Patrol Scrub disabled
Sysinfo program /root/cpu2006-1.2/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1

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
cautions.)
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: 528284252 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 Jan 25 05:55

SPEC is set to: /root/cpu2006-1.2
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda2 xfs 102G 7.1G 95G 7% /
Additional information from dmidecode:
Continued on next page
## SPEC CFP2006 Result

**Dell Inc.**

PowerEdge R730 (Intel Xeon E5-2609 v4, 1.70 GHz)

<table>
<thead>
<tr>
<th>SPECfp_rate2006 =</th>
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</tr>
</thead>
<tbody>
<tr>
<td>SPECfp_rate_base2006 =</td>
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</table>

**CPU2006 license:** 55  
**Test sponsor:** Dell Inc.  
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**Test date:** Jan-2016  
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### 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. 1.7.12 12/18/2015  
**Memory:**  
- 16x 00CE00B300CE M393A4K40BB1-CRC 32 GB 2 rank 2400 MHz, configured at 1866 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:  
LD_LIBRARY_PATH = "/root/cpu2006-1.2/lib32:/root/cpu2006-1.2/lib64:/root/cpu2006-1.2/sh"

- 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  
- Filesystem page cache cleared with:  
  - echo 1 > /proc/sys/vm/drop_caches  
- runspec command invoked through numactl i.e.:  
  - numactl --interleave=all runspec <etc>

### Base Compiler Invocation

**C benchmarks:**  
```bash  
icc -m64
```

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

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

**Benchmarks using both Fortran and C:**  
```bash  
icc -m64 ifort -m64
```

### Base Portability Flags

- 410.bwaves: -DSPEC_CPU_LP64  
- 416.gamess: -DSPEC_CPU_LP64

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Continued on next page
SPEC CFP2006 Result

Dell Inc. PowerEdge R730 (Intel Xeon E5-2609 v4, 1.70 GHz)

SPECfp_rate2006 = 435
SPECfp_rate_base2006 = 427

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

Base Portability Flags (Continued)

433.milc: -DSPEC_CPU_LP64
434.zesmpi: -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 -nofor_main
447.dealii: -DSPEC_CPU_LP64
450.soplex: -DSPEC_CPU_LP64
453.povray: -DSPEC_CPU_LP64 -nofor_main
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 -opt-prefetch -auto-p32
-ansi-alias -opt-mem-layout-trans=3

C++ benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32
-ansi-alias -opt-mem-layout-trans=3

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

Benchmarks using both Fortran and C:
-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32
-ansi-alias -opt-mem-layout-trans=3

Peak Compiler Invocation

C benchmarks:
cc -m64

C++ benchmarks:
icc -m64

Fortran benchmarks:
ifort -m64

Benchmarks using both Fortran and C:
icc -m64 ifort -m64
### Dell Inc.

**PowerEdge R730 (Intel Xeon E5-2609 v4, 1.70 GHz)**

<table>
<thead>
<tr>
<th>SPECfp_rate2006</th>
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**CPU2006 license:** 55  
**Test date:** Jan-2016  
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**Tested by:** Dell Inc.  
**Hardware Availability:** Mar-2016  
**Software Availability:** Mar-2016

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### Peak Portability Flags

Same as Base Portability Flags

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### 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) -opt-mem-layout-trans=3(pass 2)`
  `-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) -opt-mem-layout-trans=3(pass 2)`
  `-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: `basepeak = yes`
- 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) -unroll4 -auto`  
  `-inline-calloc -opt-malloc-options=3`

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Dell Inc.

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CPU2006 license: 55
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Peak Optimization Flags (Continued)

Benchmarks using both Fortran and C:

435.gromacs: -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) -opt-mem-layout-trans=3(pass 2)
-prof-use(pass 2) -opt-prefetch -auto-ilp32

436.cactusADM: basepeak = yes
454.calculix: 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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