Dell Inc.

PowerEdge M830 (Intel Xeon E5-4660 v4, 2.20 GHz)

<table>
<thead>
<tr>
<th>SPECfp®2006 = 114</th>
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<tr>
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</table>

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

Test date: Apr-2016
Hardware Availability: Jun-2016
Software Availability: Mar-2016

### Hardware
- **CPU Name**: Intel Xeon E5-4660 v4
- **CPU Characteristics**: Intel Turbo Boost Technology up to 3.00 GHz
- **CPU MHz**: 2200
- **FPU**: Integrated
- **CPU(s) enabled**: 64 cores, 4 chips, 16 cores/chip, 2 threads/core
- **CPU(s) orderable**: 2,4 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**: SUSE Linux Enterprise Server 12 SP1 3.12.49-11-default
- **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
- **System State**: Run level 3 (multi-user)
## Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Base Seconds</th>
<th>Ratio</th>
<th>Base Seconds</th>
<th>Ratio</th>
<th>Base Seconds</th>
<th>Ratio</th>
<th>Peak Seconds</th>
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<td></td>
<td></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
# Dell Inc.

**PowerEdge M830 (Intel Xeon E5-4660 v4, 2.20 GHz)**

<table>
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<tr>
<th>SPECfp2006</th>
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**CPU2006 license:** 55  
**Test sponsor:** Dell Inc.  
**Test date:** Apr-2016  
**Hardware Availability:** Jun-2016  
**Tested by:** Dell Inc.  
**Software Availability:** Mar-2016

## Platform Notes (Continued)

Memory Patrol Scrub disabled  
Sysinfo program /root/cpu2006-1.2/config/sysinfo.rev6914  
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1  
running on linux-vs2o Mon Apr 25 15:17:29 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 E5-4660 v4 @ 2.20GHz  
4 "physical id"s (chips)  
128 "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 : 32  
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  
physical 2: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15  
physical 3: 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:       529195640 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

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## SPEC CFP2006 Result

### Dell Inc.
PowerEdge M830 (Intel Xeon E5-4660 v4, 2.20 GHz)

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### Platform Notes (Continued)

- **run-level 3 Apr 25 09:44**
- **SPEC is set to:** /root/cpu2006-1.2
  - Filesystem  
    - Type: xfs  
    - Size: 365G  
    - Used: 11G  
    - Avail: 355G  
    - Use%: 3%  
    - Mounted on: /
- **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 SBMIO" standard.

- **BIOS Dell Inc. 2.0.1 03/31/2016**
- **Memory:**
  - 20x 00AD00B300AD HMA82GR7MFR8N-UH 16 GB 2 rank 2400 MHz
  - 12x 00CE00B300CE M393A2K43BB1-CRC 16 GB 2 rank 2400 MHz
  - 16x 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 = "64"

- **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
SPEC CFP2006 Result

Dell Inc.
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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
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

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Dell Inc.  
PowerEdge M830 (Intel Xeon E5-4660 v4, 2.20 GHz)  

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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-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

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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

---

**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.

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