### Dell Inc.

**PowerEdge R630 (Intel Xeon E5-2699A v4, 2.40 GHz)**

<table>
<thead>
<tr>
<th>SPECfp®2006</th>
<th>127</th>
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<tbody>
<tr>
<td>SPECfp_base2006</td>
<td>120</td>
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</tbody>
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**CPU2006 license:** 55  
**Test date:** Jan-2017  
**Test sponsor:** Dell Inc.  
**Tested by:** Dell Inc.  
**Hardware Availability:** Oct-2016  
**Software Availability:** Sep-2016

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#### Hardware

- **CPU Name:** Intel Xeon E5-2699A v4  
- **CPU Characteristics:** Intel Turbo Boost Technology up to 3.60 GHz  
- **CPU MHz:** 2400  
- **FPU:** Integrated  
- **CPU(s) enabled:** 44 cores, 2 chips, 22 cores/chip  
- **CPU(s) orderable:** 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:** SUSE Linux Enterprise Server 12 SP1  
- **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:** xfs  
- **System State:** Run level 3 (multi-user)
## SPEC CFP2006 Result

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<thead>
<tr>
<th>L3 Cache: 55 MB I+D on chip per chip</th>
<th>Base Pointers: 64-bit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other Cache: None</td>
<td>Peak Pointers: 32/64-bit</td>
</tr>
<tr>
<td>Memory: 256 GB (16 x 16 GB 2Rx8 PC4-2400T-R)</td>
<td>Other Software: None</td>
</tr>
<tr>
<td>Disk Subsystem: 1 x 120 GB SATA SSD</td>
<td></td>
</tr>
<tr>
<td>Other Hardware: None</td>
<td></td>
</tr>
</tbody>
</table>

### Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Base</th>
<th></th>
<th></th>
<th>Peak</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Seconds</td>
<td>Ratio</td>
<td>Seconds</td>
<td>Ratio</td>
<td>Seconds</td>
<td>Ratio</td>
</tr>
<tr>
<td>410.bwaves</td>
<td>24.2</td>
<td>561</td>
<td>24.2</td>
<td>562</td>
<td>23.9</td>
</tr>
<tr>
<td>416.gamess</td>
<td>463</td>
<td>42.3</td>
<td>462</td>
<td>42.4</td>
<td>460</td>
</tr>
<tr>
<td>433.milc</td>
<td>119</td>
<td>77.0</td>
<td>119</td>
<td>77.0</td>
<td>120</td>
</tr>
<tr>
<td>434.zeusmp</td>
<td>44.0</td>
<td>207</td>
<td>44.5</td>
<td>204</td>
<td>44.3</td>
</tr>
<tr>
<td>435.gromacs</td>
<td>152</td>
<td>47.1</td>
<td>150</td>
<td>47.6</td>
<td>147</td>
</tr>
<tr>
<td>436.cactusADM</td>
<td>11.4</td>
<td>1040</td>
<td>11.7</td>
<td>1030</td>
<td>11.5</td>
</tr>
<tr>
<td>437.leslie3d</td>
<td>24.6</td>
<td>381</td>
<td>24.7</td>
<td>381</td>
<td>24.3</td>
</tr>
<tr>
<td>444.namd</td>
<td>252</td>
<td>31.8</td>
<td>253</td>
<td>31.7</td>
<td>252</td>
</tr>
<tr>
<td>447.dealII</td>
<td>169</td>
<td>67.7</td>
<td>169</td>
<td>67.7</td>
<td>169</td>
</tr>
<tr>
<td>450.soplex</td>
<td>159</td>
<td>52.6</td>
<td>161</td>
<td>51.8</td>
<td>161</td>
</tr>
<tr>
<td>453.povray</td>
<td>83.9</td>
<td>63.4</td>
<td>84.1</td>
<td>63.2</td>
<td>84.4</td>
</tr>
<tr>
<td>454.calculix</td>
<td>139</td>
<td>59.2</td>
<td>139</td>
<td>59.2</td>
<td>139</td>
</tr>
<tr>
<td>459.GemsFDTD</td>
<td>47.8</td>
<td>222</td>
<td>49.2</td>
<td>216</td>
<td>48.1</td>
</tr>
<tr>
<td>465.tonto</td>
<td>239</td>
<td>41.1</td>
<td>236</td>
<td>41.6</td>
<td>228</td>
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<tr>
<td>470.lbm</td>
<td>16.2</td>
<td>849</td>
<td>14.8</td>
<td>926</td>
<td>14.9</td>
</tr>
<tr>
<td>481.wrf</td>
<td>89.2</td>
<td>125</td>
<td>87.7</td>
<td>127</td>
<td>90.5</td>
</tr>
<tr>
<td>482.sphinx3</td>
<td>270</td>
<td>72.3</td>
<td>271</td>
<td>71.9</td>
<td>271</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
SPEC CFP2006 Result

Dell Inc.

PowerEdge R630 (Intel Xeon E5-2699A v4, 2.40 GHz)

SPECfp2006 = 127
SPECfp_base2006 = 120

CPU2006 license: 55
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Platform Notes (Continued)

Memory Patrol Scrub disabled
Logical Processor disabled
Sysinfo program /root/cpu2006-1.2/config/sysinfo.rev6993
Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
running on linux-b0uv Wed Jan 4 17:18:33 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 E5-2699A v4 @ 2.40GHz
  2 "physical id"s (chips)
  44 "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 : 22
  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: 264568088 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:
Linux linux-b0uv 3.12.49-11-default #1 SMP Wed Nov 11 20:52:43 UTC 2015

Continued on next page
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### Platform Notes (Continued)

```
run-level 3 Jan 4 12:33

SPEC is set to: /root/cpu2006-1.2
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda2 xfs 110G 22G 89G 20% /
```

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. 2.2.5 09/06/2016
Memory:
  14x 00AD063200AD HMA82GR7MFR8N-UH 16 GB 2 rank 2400 MHz
  2x 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,compact"
LD_LIBRARY_PATH = "/root/cpu2006-1.2/libs/32:/root/cpu2006-1.2/libs/64:/root/cpu2006-1.2/sh10.2"
OMP_NUM_THREADS = "44"
```

Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM memory using Redhat Enterprise Linux 7.2

Transparent Huge Pages disabled 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
```
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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 -nofor_main
447.dealII: -DSPEC_CPU_LP64
450.soplex: -DSPEC_CPU_LP64
453.povray: -DSPEC_CPU_LP64 -nofor_main
454.calculix: -DSPEC_CPU_LP64
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 -qopt-prefetch
C++ benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
Fortran benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -qopt-prefetch
Benchmarks using both Fortran and C:
-xCORE-AVX2 -ipo -O3 -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
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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-iiptd

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

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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
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.