Dell Inc.

PowerEdge R730 (Intel Xeon E5-2698 v4, 2.20 GHz)

**SPECfp®2006 = 126**

**SPECfp_base2006 = 119**

<table>
<thead>
<tr>
<th>Software</th>
<th>CPU Name: Intel Xeon E5-2698 v4</th>
<th>Operating System: SUSE Linux Enterprise Server 12</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CPU Characteristics: Intel Turbo Boost Technology up to 3.60 GHz</td>
<td>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</td>
</tr>
<tr>
<td></td>
<td>CPU MHZ: 2200</td>
<td>Auto Parallel: Yes</td>
</tr>
<tr>
<td></td>
<td>FPU: Integrated</td>
<td>File System: ext4</td>
</tr>
<tr>
<td></td>
<td>CPU(s) enabled: 40 cores, 2 chips, 20 cores/chip</td>
<td>System State: Run level 3 (multi-user)</td>
</tr>
<tr>
<td></td>
<td>CPU(s) orderable: 1,2 chips</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Primary Cache: 32 KB I + 32 KB D on chip per core</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Secondary Cache: 256 KB I+D on chip per core</td>
<td></td>
</tr>
</tbody>
</table>

**Hardware**

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Spec</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>410.bwaves</td>
<td>584</td>
<td>46.9</td>
</tr>
<tr>
<td>416.gamess</td>
<td>42.4</td>
<td>76.0</td>
</tr>
<tr>
<td>433.milc</td>
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<td>434.zeusmp</td>
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<td>47.1</td>
</tr>
<tr>
<td>436.cactusADM</td>
<td>76.0</td>
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<td>437.leslie3d</td>
<td>379</td>
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<td>444.namd</td>
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<td>447.dealII</td>
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<td>450.soplex</td>
<td>51.7</td>
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<td>453.povray</td>
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<td>454.calculix</td>
<td>57.8</td>
<td>57.6</td>
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<tr>
<td>459.GemsFDTD</td>
<td>57.6</td>
<td>268</td>
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<tr>
<td>465.tonto</td>
<td>268</td>
<td>60.3</td>
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<tr>
<td>470.lbm</td>
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<tr>
<td>481.wrf</td>
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<tr>
<td>482.sphinx3</td>
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</tbody>
</table>

**Continued on next page**
## SPEC CFP2006 Result

### Dell Inc.

PowerEdge R730 (Intel Xeon E5-2698 v4, 2.20 GHz)  

<table>
<thead>
<tr>
<th>CPU2006 license: 55</th>
<th>Test date: Feb-2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test sponsor: Dell Inc.</td>
<td>Hardware Availability: Mar-2016</td>
</tr>
<tr>
<td>Tested by: Dell Inc.</td>
<td>Software Availability: Nov-2016</td>
</tr>
</tbody>
</table>

#### L3 Cache:
- 50 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

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<td>70.0</td>
<td>278</td>
<td>70.0</td>
<td>279</td>
<td>69.9</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 R730 (Intel Xeon E5-2698 v4, 2.20 GHz)

SPECfp2006 = 126
SPECfp_base2006 = 119

CPUC006 license: 55
Test sponsor: Dell Inc.
Tested by: Dell Inc.

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 (b5e8d4b4eb51ed28d7f98696cbe290c1)
runtime on linux-0171 Mon Feb 6 20:31:03 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
data name: Intel(R) Xeon(R) CPU E5-2698 v4 @ 2.20GHz
data physical id"s (chips)
40 "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 : 20
siblings : 20
physical 0: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28
physical 1: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28

cache size : 51200 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
Dell Inc.
PowerEdge R730 (Intel Xeon E5-2698 v4, 2.20 GHz)

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SPECfp_base2006 = 119

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 6 15:25

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 0OAD063200AD 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
SPEC CFP2006 Result

Dell Inc.

PowerEdge R730 (Intel Xeon E5-2698 v4, 2.20 GHz)

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CPU2006 license: 55
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Dell Inc.

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SPECfp2006 = 126
SPECfp_base2006 = 119

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

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 -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LINUX
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
Dell Inc.

PowerEdge R730 (Intel Xeon E5-2698 v4, 2.20 GHz)

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

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

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-iipt32

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.gameess: -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
-qqpt-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 -qqpt-malloc-options=3
-auto -unroll4

Continued on next page
Dell Inc.

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CPU2006 license: 55
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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-icl7.0-official-linux64.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/Intel-icl7.0-official-linux64.xml

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For other inquiries, please contact webmaster@spec.org.

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