Dell Inc.  

PowerEdge R930 (Intel Xeon E7-4850 v4, 2.10 GHz)  

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

CPU Name: Intel Xeon E7-4850 v4  
CPU Characteristics: Intel Turbo Boost Technology up to 2.80 GHz  
CPU MHz: 2100  
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

Hardware  

Software  

Operating System: SUSE Linux Enterprise Server 12 SP1  
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)  

SPECfp®2006 = 109  
SPECfp_base2006 = 103  

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L3 Cache: 40 MB I+D on chip per chip
Other Cache: None
Memory: 512 GB (32 x 16 GB 2Rx4 PC4-2133P-R, running at 1333 MHz)
Disk Subsystem: 1 x 480 GB SAS SSD
Other Hardware: None

Base Pointers: 64-bit
Peak Pointers: 32/64-bit
Other Software: None

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<td>305</td>
<td>63.9</td>
</tr>
</tbody>
</table>

Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"

Platform Notes

BIOS Settings:
Virtualization Technology Disabled
System Profile set to Custom
CPU Power Management set to Hardware P States
Memory Frequency set to Maximum Performance
Turbo Boost Enabled
Energy Efficient Turbo Enabled
C1E Disabled
C States set to Autonomous
Dell Inc.

PowerEdge R930 (Intel Xeon E7-4850 v4, 2.10 GHz)  

**SPECfp2006 =** 109  
**SPECfp_base2006 =** 103

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<td>Test date:</td>
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<td>Hardware Availability:</td>
<td>Jun-2016</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Dec-2015</td>
</tr>
</tbody>
</table>

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**Platform Notes (Continued)**

Collaborative CPU Performance Control Disabled  
Memory Patrol Scrub Disabled  
Memory Refresh Rate set to 1x  
Uncore Frequency set to Dynamic  
Energy Efficient Policy set to Performance  
Monitor/MWait Enabled  
Snoop Mode set to Home Snoop  
Sysinfo program /root/ic16.0_Sept12_2015/config/sysinfo.rev6914  
$Rev: 6914$ $Date:: 2014-06-25#$ e3fbb8667b5a285932ceab81e28219e1  
running on bdx-perf04 Wed May 11 14:50:47 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 E7-4850 v4 @ 2.10GHz  
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: 529322532 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"
Dell Inc.  

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Platform Notes (Continued)

ANSI_COLOR="0;32"  
CPE_NAME="cpe:/o:suse:sles:12:sp1"  

uname -a:  
(8d714a0) x86_64 x86_64 x86_64 GNU/Linux  

run-level 3 May 11 08:28  

SPEC is set to: /root/ic16.0_Sept12_2015  

Filesystem     Type  Size  Used Avail Use% Mounted on  
/dev/sda2      xfs   369G  9.8G  359G   3% /  

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. 2.0.1 04/20/2016  
Memory:  
32x 00AD00B300AD HMA42GR7MFR4N-TF 16 GB 2 rank 2133 MHz, configured at 1333 MHz  
64x 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"  
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  

Continued on next page
### Base Compiler Invocation (Continued)

Benchmarks using both Fortran and C:

```bash
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`
- 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`

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Continued on next page
Dell Inc.

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Test date: May-2016
Hardware Availability: Jun-2016
Software Availability: Dec-2015

Peak Compiler Invocation (Continued)

C++ benchmarks:
icpc  -m64

Fortran benchmarks:
ifort -m64

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-

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CPU2006 license: 55
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Software Availability: Dec-2015

Peak Optimization Flags (Continued)

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
-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

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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 26 July 2016.