Dell Inc.

PowerEdge R630 (Intel Xeon E5-2630 v4, 2.20 GHz)

Specfp®2006 = 109
Specfp_base2006 = 103

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

Hardware
CPU Name: Intel Xeon E5-2630 v4
CPU Characteristics: Intel Turbo Boost Technology up to 3.10 GHz
CPU MHz: 2200
FPU: Integrated
CPU(s) enabled: 20 cores, 2 chips, 10 cores/chip, 2 threads/core
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: Red Hat Enterprise Linux Server release 7.2 (Maipo) 3.10.0-327.el7.x86_64
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

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- **Tested by:** Dell Inc.  
- **Test date:** Mar-2016  
- **Hardware Availability:** Mar-2016  
- **Software Availability:** Mar-2016

#### System Details
- **L3 Cache:** 25 MB I+D on chip per chip  
- **Other Cache:** None  
- **Memory:** 256 GB (16 x 16 GB 2Rx4 PC4-2400T-R, running at 2133 MHz)  
- **Disk Subsystem:** 1 x 500 GB 7200 RPM SATA  
- **Other Hardware:** None  
- **Operating System Notes:** Stack size set to unlimited using "ulimit -s unlimited"  
- **Platform Notes:**  
  - BIOS settings:  
  - Snoopy Mode set to Opportunistic Snoopy Broadcast  
  - Virtualization Technology disabled  
  - System Profile set to Custom  
  - CPU Power Management set to Maximum Performance  
  - Energy Efficient Turbo disabled  
  - Memory Patrol Scrub disabled  
  - Cstate autonomous/C1E enabled  
  - Energy Efficient Policy set to Performance

#### Results Table

<table>
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<th>Benchmark</th>
<th>Base</th>
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<td>Seconds</td>
<td>Ratio</td>
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<tr>
<td>410.bwaves</td>
<td>28.5</td>
<td>477</td>
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<td>416.gamess</td>
<td>608</td>
<td>608</td>
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<tr>
<td>433.milc</td>
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<tr>
<td>434.zeusmp</td>
<td>50.1</td>
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<td>435.gromacs</td>
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<tr>
<td>437.leslie3d</td>
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<td>444.namd</td>
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<td>465.tonto</td>
<td>256</td>
<td>38.5</td>
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<tr>
<td>470.lbm</td>
<td>21.0</td>
<td>655</td>
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<tr>
<td>481.wrf</td>
<td>103</td>
<td>109</td>
</tr>
<tr>
<td>482.sphinx3</td>
<td>289</td>
<td>67.5</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:  
- Snoopy Mode set to Opportunistic Snoopy Broadcast  
- Virtualization Technology disabled  
- System Profile set to Custom  
- CPU Power Management set to Maximum Performance  
- Energy Efficient Turbo disabled  
- Memory Patrol Scrub disabled  
- Cstate autonomous/C1E enabled  
- Energy Efficient Policy set to Performance
Platform Notes (Continued)

Sysinfo program /root/cpu2006-1.2/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
running on localhost.localdomain Fri Mar 11 08:54:03 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 E5-2630 v4 @ 2.20GHz
  2 "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 : 10
siblings : 20
  physical 0: cores 0 1 2 3 4 8 9 10 11 12
  physical 1: cores 0 1 2 3 4 8 9 10 11 12
  cache size : 25600 KB

From /proc/meminfo
MemTotal:       264040556 kB
HugePages_Total:       0
Hugepagesize:       2048 kB

From /etc/*release* /etc/*version*
os-release:
  NAME="Red Hat Enterprise Linux Server"
  VERSION="7.2 (Maipo)"
  ID="rhel"
  ID_LIKE="fedora"
  VERSION_ID="7.2"
  PRETTY_NAME="Red Hat Enterprise Linux Server 7.2 (Maipo)"
  ANSI_COLOR="0;31"
  CPE_NAME="cpe:/o:redhat:enterprise_linux:7.2:GA:server"
redhat-release: Red Hat Enterprise Linux Server release 7.2 (Maipo)
system-release: Red Hat Enterprise Linux Server release 7.2 (Maipo)

uname -a:
Linux localhost.localdomain 3.10.0-327.el7.x86_64 #1 SMP Thu Oct 29 17:29:29
EDT 2015 x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Mar 11 03:26

SPEC is set to: /root/cpu2006-1.2
Filesystem  Type  Size  Used Avail Use% Mounted on
/dev/sda2  xfs  256G  12G  245G  5% /

Additional information from dmidecode:

Warning: Use caution when you interpret this section. The 'dmidecode' program
Continued on next page
SPEC CFP2006 Result

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Platform Notes (Continued)

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 02/12/2016
Memory:
16x 002C0632002C 18ASF2G72PDZ-2G3B1 16 GB 2 rank 2400 MHz, configured at 2133
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,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 = "20"

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

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

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Base Portability Flags (Continued)

437.leslie3d: \texttt{-DSPEC\_CPU\_LP64}
444.namd: \texttt{-DSPEC\_CPU\_LP64}
447.dealII: \texttt{-DSPEC\_CPU\_LP64}
450.soplex: \texttt{-DSPEC\_CPU\_LP64}
453.povray: \texttt{-DSPEC\_CPU\_LP64}
454.calculix: \texttt{-DSPEC\_CPU\_LP64 \_nofor\_main}
459.GemsFDTD: \texttt{-DSPEC\_CPU\_LP64}
465.tonto: \texttt{-DSPEC\_CPU\_LP64}
470.lbm: \texttt{-DSPEC\_CPU\_LP64}
481.wrf: \texttt{-DSPEC\_CPU\_LP64 \_DSPEC\_CPU\_CASE\_FLAG \_DSPEC\_CPU\_LINUX}
482.sphinx3: \texttt{-DSPEC\_CPU\_LP64}

Base Optimization Flags

C benchmarks:
\texttt{-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -opt-prefetch -ansi-alias}

C++ benchmarks:
\texttt{-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -ansi-alias}

Fortran benchmarks:
\texttt{-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -opt-prefetch}

Benchmarks using both Fortran and C:
\texttt{-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -opt-prefetch -ansi-alias}

Peak Compiler Invocation

C benchmarks:
\texttt{icc -m64}

C++ benchmarks:
\texttt{icpc -m64}

Fortran benchmarks:
\texttt{ifort -m64}

Benchmarks using both Fortran and C:
\texttt{icc -m64 ifort -m64}
SPEC CFP2006 Result

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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: -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
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

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**Peak Optimization Flags (Continued)**

465.tonto (continued):
- `-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

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The flags files that were used to format this result can be browsed at:


You can also download the XML flags sources by saving the following links:


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