SPEC® CFP2006 Result

Dell Inc.

$SPECfp^{®}2006 =$ 120

PowerEdge R730 (Intel Xeon E5-2697A v4, 2.60 GHz)

$SPECfp\_base2006 =$ 115
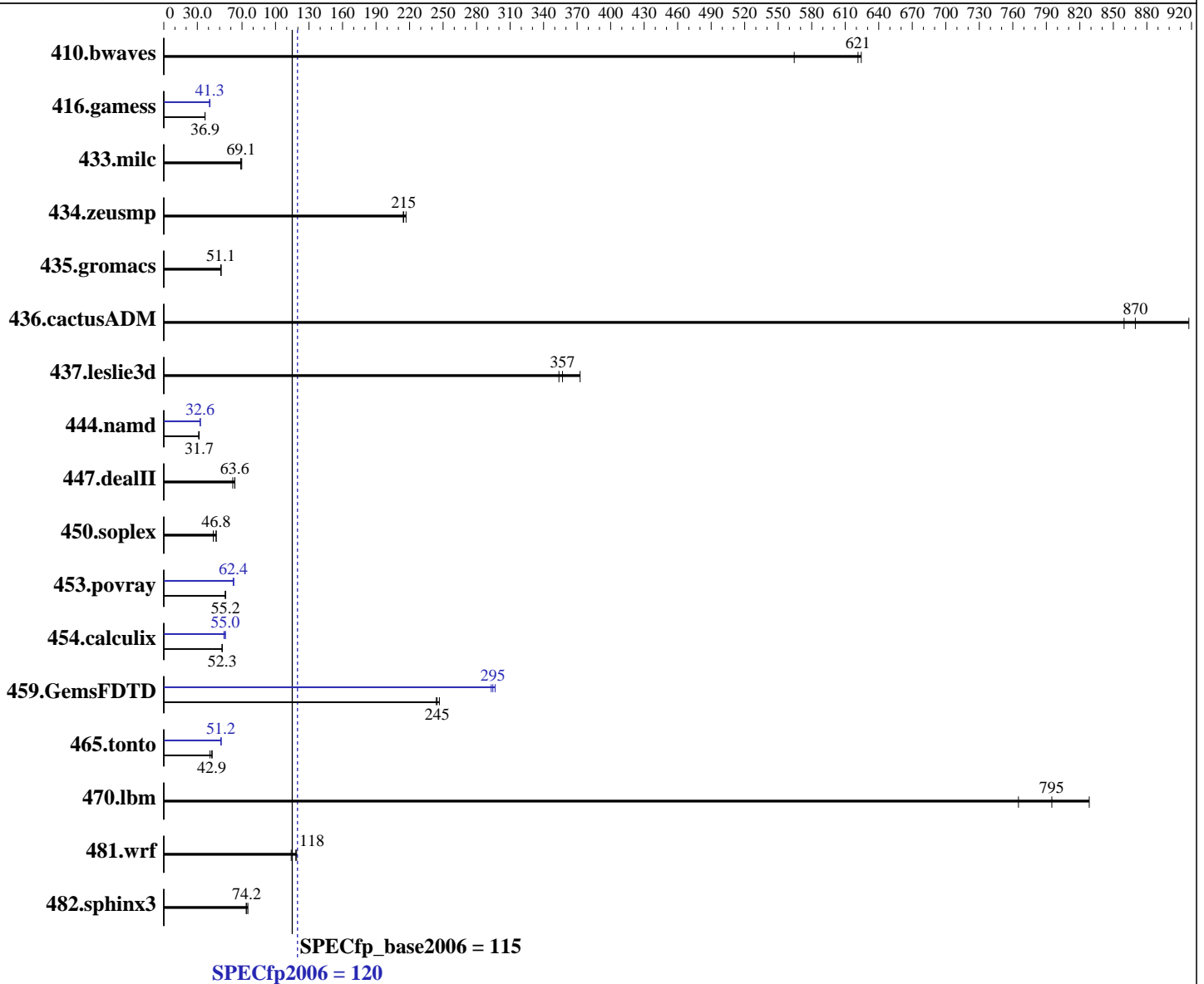
CPU2006 license: 55   **Test date:** Oct-2015

Test sponsor: Dell Inc.   **Hardware Availability:** Mar-2016

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

Results chart (scale 0 to 920):

- 410.bwaves: 621
- 416.gamess: 41.3 / 36.9
- 433.milc: 69.1
- 434.zeusmp: 215
- 435.gromacs: 51.1
- 436.cactusADM: 870
- 437.leslie3d: 357
- 444.namd: 32.6 / 31.7
- 447.dealII: 63.6
- 450.soplex: 46.8
- 453.povray: 62.4 / 55.2
- 454.calculix: 55.0 / 52.3
- 459.GemsFDTD: 295 / 245
- 465.tonto: 51.2 / 42.9
- 470.lbm: 795
- 481.wrf: 118
- 482.sphinx3: 74.2

SPECfp_base2006 = 115

SPECfp2006 = 120

Hardware

CPU Name:	Intel Xeon E5-2697A v4
CPU Characteristics:	Intel Turbo Boost Technology up to 3.60 GHz
CPU MHz:	2600
FPU:	Integrated
CPU(s) enabled:	32 cores, 2 chips, 16 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

Continued on next page

Software

Operating System:	Red Hat Enterprise Linux Server release 7.1 (Maipo) 3.10.0-229.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

Continued on next page

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L3 Cache:	40 MB I+D on chip per chip	System State:	Run level 3 (multi-user)
Other Cache:	None	Base Pointers:	64-bit
Memory:	512 GB (16 x 32 GB 2Rx4 PC4-2400T-R)	Peak Pointers:	32/64-bit
Disk Subsystem:	1 x 160 GB SATA SSD	Other Software:	None
Other Hardware:	None		

Results Table

	Base						Peak					
Benchmark	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	24.1	564	21.8	624	**21.9**	**621**	24.1	564	21.8	624	**21.9**	**621**
416.gamess	**531**	**36.9**	532	36.8	530	36.9	479	40.9	**474**	**41.3**	474	41.3
433.milc	133	68.9	132	69.8	**133**	**69.1**	133	68.9	132	69.8	**133**	**69.1**
434.zeusmp	**42.4**	**215**	42.5	214	42.0	217	**42.4**	**215**	42.5	214	42.0	217
435.gromacs	139	51.4	**140**	**51.1**	140	51.1	139	51.4	**140**	**51.1**	140	51.1
436.cactusADM	13.9	860	13.0	918	**13.7**	**870**	13.9	860	13.0	918	**13.7**	**870**
437.leslie3d	26.6	354	25.2	373	**26.3**	**357**	26.6	354	25.2	373	**26.3**	**357**
444.namd	253	31.7	257	31.2	**253**	**31.7**	**246**	**32.6**	246	32.6	246	32.6
447.dealII	180	63.6	185	61.7	**180**	**63.6**	180	63.6	185	61.7	**180**	**63.6**
450.soplex	**178**	**46.8**	188	44.3	178	46.9	**178**	**46.8**	188	44.3	178	46.9
453.povray	**96.4**	**55.2**	96.3	55.3	96.7	55.0	85.7	62.1	**85.3**	**62.4**	84.9	62.6
454.calculix	158	52.3	158	52.2	**158**	**52.3**	153	53.8	**150**	**55.0**	150	55.1
459.GemsFDTD	43.0	247	**43.4**	**245**	43.5	244	35.8	297	**36.0**	**295**	36.2	293
465.tonto	**229**	**42.9**	238	41.4	227	43.3	192	51.3	192	51.2	**192**	**51.2**
470.lbm	18.0	765	**17.3**	**795**	16.6	828	18.0	765	**17.3**	**795**	16.6	828
481.wrf	93.9	119	**94.6**	**118**	98.0	114	93.9	119	**94.6**	**118**	98.0	114
482.sphinx3	259	75.3	**263**	**74.2**	264	73.7	259	75.3	**263**	**74.2**	264	73.7

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 Performance
Memory Patrol Scrub disabled
Cstates/C1E enabled
Sysinfo program /root/cpu2006-1.2/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
running on localhost.localdomain Tue Oct 27 16:01:20 2015
```

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Platform Notes (Continued)

```
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 E5-2697A v4 @ 2.60GHz
      2 "physical id"s (chips)
      64 "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
   cache size : 40960 KB

From /proc/meminfo
   MemTotal:       528283000 kB
   HugePages_Total:        0
   Hugepagesize:        2048 kB

From /etc/*release* /etc/*version*
   os-release:
      NAME="Red Hat Enterprise Linux Server"
      VERSION="7.1 (Maipo)"
      ID="rhel"
      ID_LIKE="fedora"
      VERSION_ID="7.1"
      PRETTY_NAME="Red Hat Enterprise Linux Server 7.1 (Maipo)"
      ANSI_COLOR="0;31"
      CPE_NAME="cpe:/o:redhat:enterprise_linux:7.1:GA:server"
   redhat-release: Red Hat Enterprise Linux Server release 7.1 (Maipo)
   system-release: Red Hat Enterprise Linux Server release 7.1 (Maipo)
   system-release-cpe: cpe:/o:redhat:enterprise_linux:7.1:ga:server

uname -a:
   Linux localhost.localdomain 3.10.0-229.el7.x86_64 #1 SMP Thu Jan 29 18:37:38
   EST 2015 x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Oct 27 10:48

SPEC is set to: /root/cpu2006-1.2
   Filesystem      Type  Size  Used Avail Use% Mounted on
   /dev/sda2       xfs   131G  8.6G  122G   7% /
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.
```

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Platform Notes (Continued)

```
  BIOS Dell Inc. 1.7.8 10/19/2015
  Memory:
   16x 00CE00B300CE M393A4K40BB1-CRC 32 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,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 = "32"

 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
    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
```

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Base Portability Flags (Continued)

```
  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
```

Benchmarks using both Fortran and C:
```
icc    -m64 ifort -m64
```

Peak Portability Flags

```
Same as Base Portability Flags
```

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Software Availability: Mar-2016

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`
   `-opt-malloc-options=3 -auto -unroll4`

Benchmarks using both Fortran and C:

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Peak Optimization Flags (Continued)

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
http://www.spec.org/cpu2006/flags/Dell-Platform-Settings-V1.2-revD.20151006.html

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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

For questions about this result, please contact the tester.
For other inquiries, please contact webmaster@spec.org.

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