SPEC® CFP2006 Result
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Hewlett-Packard Company

ProLiant BL660c Gen8
(2.40 GHz, Intel Xeon E5-4610)

$SPECfp^{®}\_rate2006 = 696$

$SPECfp\_rate\_base2006 = 684$

CPU2006 license: 3
Test sponsor: Hewlett-Packard Company
Tested by: Hewlett-Packard Company

Test date: Feb-2013
Hardware Availability: Oct-2012
Software Availability: Jul-2012

	Copies	Value (blue)	Value (base)
410.bwaves	48 / 48	594	593
416.gamess	48 / 48	712	687
433.milc	48 / 48	579	578
434.zeusmp	48		775
435.gromacs	48 / 48	565	562
436.cactusADM	48		899
437.leslie3d	48 / 48	443	443
444.namd	48 / 48	563	559
447.dealII	48		1260
450.soplex	48 / 48	516	485
453.povray	48 / 48	1090	949
454.calculix	48 / 48	874	872
459.GemsFDTD	48		425
465.tonto	48 / 48	805	775
470.lbm	48		827
481.wrf	48 / 48	767	757
482.sphinx3	48		657

SPECfp_rate_base2006 = 684
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Hardware

CPU Name: Intel Xeon E5-4610
CPU Characteristics: Intel Turbo Boost Technology up to 2.90 GHz
CPU MHz: 2400
FPU: Integrated
CPU(s) enabled: 24 cores, 4 chips, 6 cores/chip, 2 threads/core
CPU(s) orderable: 1,2,4 chips
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 6.3, (Santiago)
Kernel 2.6.32-279.el6.x86_64
Compiler: C/C++: Version 12.1.2.273 of Intel C++ Studio XE for Linux;
Fortran: Version 12.1.2.273 of Intel Fortran Studio XE for Linux
Auto Parallel: No
File System: ext4

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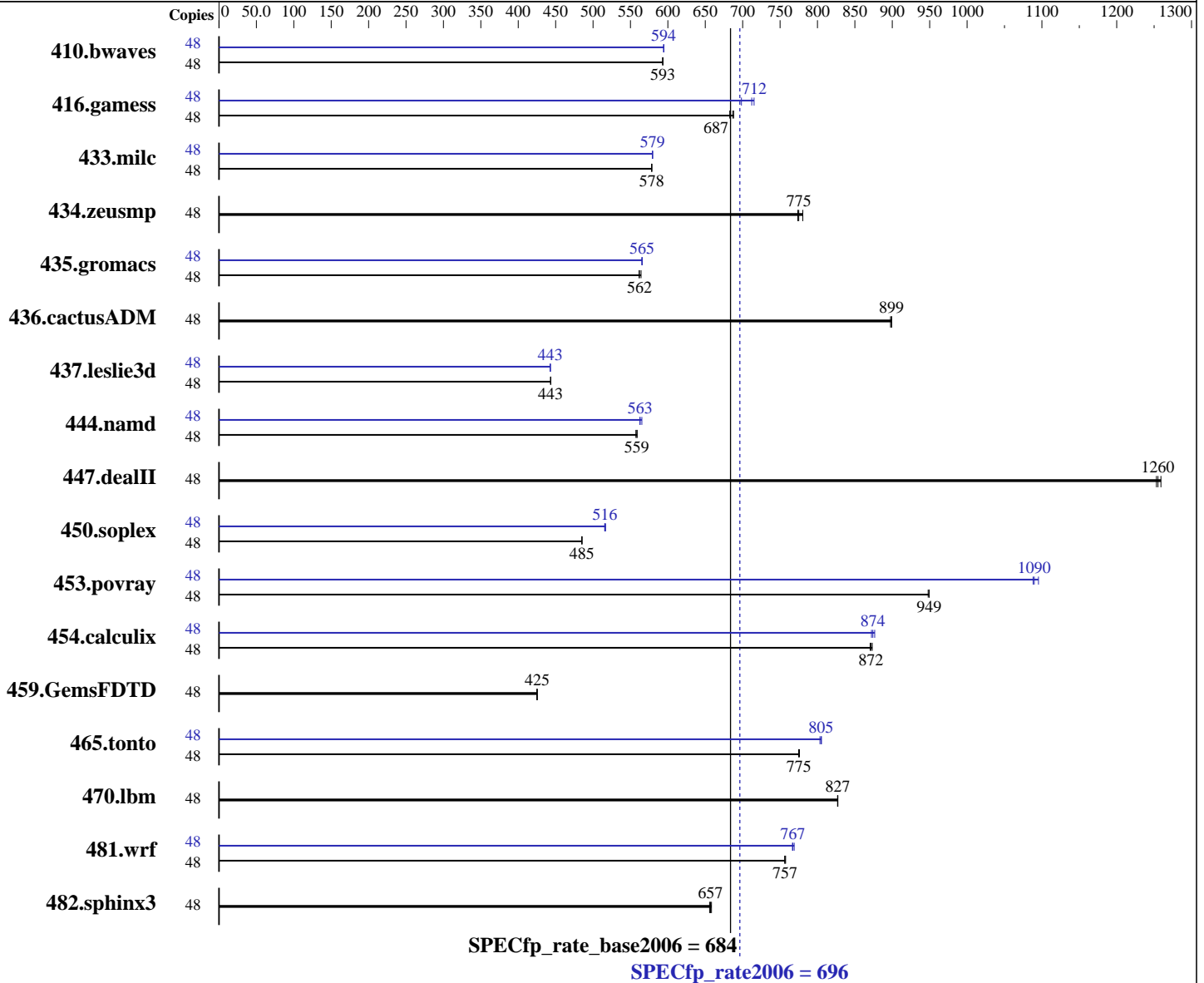|	
CPU2006 license: 3	**Test date:** Feb-2013
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L3 Cache:	15 MB I+D on chip per chip	System State:	Run level 3 (multi-user)
Other Cache:	None	Base Pointers:	32/64-bit
Memory:	256 GB (32 x 8 GB 2Rx4 PC3-12800R-11, ECC)	Peak Pointers:	32/64-bit
Disk Subsystem:	2 x 146 GB 15 K SAS, RAID 1	Other Software:	none
Other Hardware:	None		

Results Table

Benchmark	_ Base Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Peak Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	48	1100	593	**1100**	**593**	1099	593	48	1097	595	1097	594	**1097**	**594**
416.gamess	48	**1369**	**687**	1366	688	1377	683	48	1314	715	**1320**	**712**	1346	698
433.milc	48	762	579	**762**	**578**	762	578	48	760	580	**760**	**579**	760	579
434.zeusmp	48	565	774	560	780	**564**	**775**	48	565	774	560	780	**564**	**775**
435.gromacs	48	607	564	610	562	**610**	**562**	48	606	566	**606**	**565**	606	565
436.cactusADM	48	**638**	**899**	639	898	638	899	48	**638**	**899**	639	898	638	899
437.leslie3d	48	1018	443	1017	443	**1018**	**443**	48	**1019**	**443**	1018	443	1019	443
444.namd	48	**689**	**559**	689	559	691	557	48	681	565	684	563	**684**	**563**
447.dealII	48	436	1260	**437**	**1260**	438	1250	48	436	1260	**437**	**1260**	438	1250
450.soplex	48	**825**	**485**	826	485	825	485	48	775	517	776	516	**776**	**516**
453.povray	48	269	948	269	949	**269**	**949**	48	235	1090	233	1100	**234**	**1090**
454.calculix	48	**454**	**872**	454	873	455	870	48	452	876	454	872	**453**	**874**
459.GemsFDTD	48	**1197**	**425**	1199	425	1197	425	48	**1197**	**425**	1199	425	1197	425
465.tonto	48	**609**	**775**	610	775	609	776	48	587	805	588	803	**587**	**805**
470.lbm	48	798	827	797	827	**797**	**827**	48	798	827	797	827	**797**	**827**
481.wrf	48	**709**	**757**	709	756	708	757	48	699	767	**699**	**767**	697	769
482.sphinx3	48	1427	656	1421	658	**1424**	**657**	48	1427	656	1421	658	**1424**	**657**

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit'
was used to generate numactl commands to bind each copy to a specific processor.
For details, please see the config file.

Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"
Transparent Huge Pages enabled with:
echo always > /sys/kernel/mm/transparent_hugepage/enabled
Filesystem page cache cleared with:
echo 1 >   /proc/sys/vm/drop_caches
runspec command invoked through numactl i.e.:
numactl --interleave=all runspec <etc>

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Platform Notes

```
BIOS Configuration:
 HP Power Profile set to Custom
 Energy/Performance Bias is set to Maximum Performance
 Thermal Configuration set to Maximum Cooling
 Collaborative Power Control set to Disabled
 Processor Power and Utilization Monitoring set to Disabled

Sysinfo program /cpu2006/config/sysinfo.rev6800
$Rev: 6800 $ $Date:: 2011-10-11 #$ 6f2ebdff5032aaa42e583f96b07f99d3
running on BL660Gen8 Fri Feb  1 01:17:15 2013

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 E5-4610 0 @ 2.40GHz
      4 "physical id"s (chips)
      48 "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 : 6
      siblings  : 12
      physical 0: cores 0 1 2 3 4 5
      physical 1: cores 0 1 2 3 4 5
      physical 2: cores 0 1 2 3 4 5
      physical 3: cores 0 1 2 3 4 5
   cache size : 15360 KB

From /proc/meminfo
   MemTotal:      264633760 kB
   HugePages_Total:       0
   Hugepagesize:       2048 kB

/usr/bin/lsb_release -d
   Red Hat Enterprise Linux Server release 6.3 (Santiago)

From /etc/*release* /etc/*version*
   redhat-release: Red Hat Enterprise Linux Server release 6.3 (Santiago)
   system-release: Red Hat Enterprise Linux Server release 6.3 (Santiago)
   system-release-cpe: cpe:/o:redhat:enterprise_linux:6server:ga:server

uname -a:
   Linux BL660Gen8 2.6.32-279.el6.x86_64 #1 SMP Wed Jun 13 18:24:36 EDT 2012
   x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Jan 31 10:19 last=5

SPEC is set to: /cpu2006
   Filesystem     Type     Size  Used Avail Use% Mounted on
   /dev/sda3      ext4     133G   12G  114G  10% /
```
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CPU2006 license: 3
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Platform Notes (Continued)

```
  Additional information from dmidecode:
    BIOS HP I32 08/12/2012
    Memory:
     32x HP Not Specified 8 GB 1600 MHz 2 rank

  (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 = "/cpu2006/libs2/32:/cpu2006/libs2/64"

 Binaries compiled on a system with 2x Xeon E5-2667 CPU + 256GB
 memory using SLES11SP2RC3
```

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
   454.calculix: -DSPEC_CPU_LP64 -nofor_main
```

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Base Portability Flags (Continued)

```
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:
```
-xAVX -ipo -O3 -no-prec-div -static -opt-prefetch -auto-p32
-ansi-alias -opt-mem-layout-trans=3
```

C++ benchmarks:
```
-xAVX -ipo -O3 -no-prec-div -static -opt-prefetch -auto-p32
-ansi-alias -opt-mem-layout-trans=3
```

Fortran benchmarks:
```
-xAVX -ipo -O3 -no-prec-div -static -opt-prefetch
```

Benchmarks using both Fortran and C:
```
-xAVX -ipo -O3 -no-prec-div -static -opt-prefetch -auto-p32
-ansi-alias -opt-mem-layout-trans=3
```

Peak Compiler Invocation

C benchmarks:
```
icc   -m64
```

C++ benchmarks (except as noted below):
```
icpc  -m64
```
```
  450.soplex: icpc -m32
```

Fortran benchmarks:
```
ifort -m64
```

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

Peak Portability Flags

```
410.bwaves: -DSPEC_CPU_LP64
416.gamess: -DSPEC_CPU_LP64
```

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CPU2006 license: 3
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Tested by: Hewlett-Packard Company

Test date: Feb-2013
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Software Availability: Jul-2012

Peak Portability Flags (Continued)

```
    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
   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
```

Peak Optimization Flags

C benchmarks:

```
    433.milc: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
            -no-prec-div(pass 2) -prof-use(pass 2) -static -auto-ilp32
            -opt-mem-layout-trans=3

    470.lbm: basepeak = yes

  482.sphinx3: basepeak = yes
```

C++ benchmarks:

```
    444.namd: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
            -no-prec-div(pass 2) -prof-use(pass 2) -fno-alias
            -auto-ilp32

   447.dealII: basepeak = yes

  450.soplex: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
            -no-prec-div(pass 2) -prof-use(pass 2) -opt-malloc-options=3

   453.povray: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
            -no-prec-div(pass 2) -prof-use(pass 2) -unroll4 -ansi-alias
```

Fortran benchmarks:

```
   410.bwaves: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
            -no-prec-div(pass 2) -prof-use(pass 2) -static

  416.gamess: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
            -no-prec-div(pass 2) -prof-use(pass 2) -unroll2
            -inline-level=0 -scalar-rep- -static
```

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Peak Optimization Flags (Continued)

```
    434.zeusmp: basepeak = yes

    437.leslie3d: -xAVX -ipo -O3 -no-prec-div -static -opt-prefetch

  459.GemsFDTD: basepeak = yes

    465.tonto: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
               -no-prec-div(pass 2) -prof-use(pass 2) -unroll4 -auto
               -inline-calloc -opt-malloc-options=3
```

Benchmarks using both Fortran and C:

```
    435.gromacs: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
               -no-prec-div(pass 2) -prof-use(pass 2) -opt-prefetch
               -static -auto-ilp32 -opt-mem-layout-trans=3

  436.cactusADM: basepeak = yes

    454.calculix: -xAVX -ipo -O3 -no-prec-div -static -auto-ilp32
               -opt-mem-layout-trans=3

      481.wrf: Same as 454.calculix
```

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2006/flags/Intel-ic12.1-official-linux64.20120425.html
http://www.spec.org/cpu2006/flags/HP-Platform-Flags-Intel-V1.2-A.20120829.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/Intel-ic12.1-official-linux64.20120425.xml
http://www.spec.org/cpu2006/flags/HP-Platform-Flags-Intel-V1.2-A.20120829.xml

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

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