SPEC® CFP2006 Result
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Hewlett-Packard Company

ProLiant BL660c Gen8
(2.40 GHz, Intel Xeon E5-4640)

$SPECfp^{®}_rate2006 = $ **818**

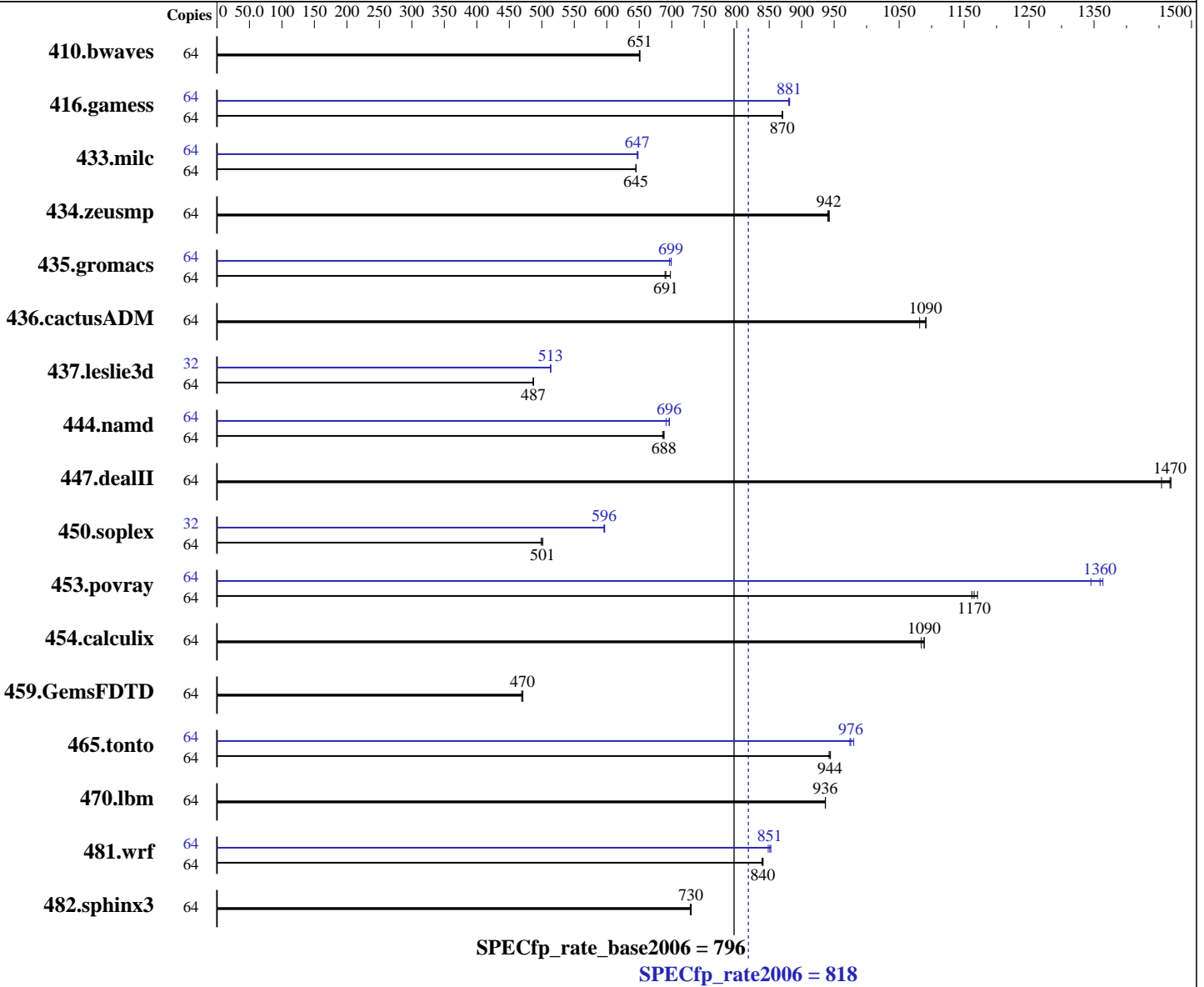SPECfp_rate_base2006 = **796**

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

Test date: Sep-2012
Hardware Availability: Oct-2012
Software Availability: Jun-2012

Benchmark	Copies	Result
410.bwaves	64	651
416.gamess	64	881
416.gamess	64	870
433.milc	64	647
433.milc	64	645
434.zeusmp	64	942
435.gromacs	64	699
435.gromacs	64	691
436.cactusADM	64	1090
437.leslie3d	32	513
437.leslie3d	64	487
444.namd	64	696
444.namd	64	688
447.dealII	64	1470
450.soplex	32	596
450.soplex	64	501
453.povray	64	1360
453.povray	64	1170
454.calculix	64	1090
459.GemsFDTD	64	470
465.tonto	64	976
465.tonto	64	944
470.lbm	64	936
481.wrf	64	851
481.wrf	64	840
482.sphinx3	64	730

SPECfp_rate_base2006 = 796

SPECfp_rate2006 = 818

Hardware

CPU Name: Intel Xeon E5-4640
CPU Characteristics: Intel Turbo Boost Technology up to 2.80 GHz
CPU MHz: 2400
FPU: Integrated
CPU(s) enabled: 32 cores, 4 chips, 8 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

Continued on next page

Software

Operating System: Red Hat Enterprise Linux Server release 6.3 (Santiago)
2.6.32-279.el6.x86_64
Compiler: C/C++: Version 12.1.0.225 of Intel C++ Studio XE for Linux;
Fortran: Version 12.1.0.225 of Intel Fortran Studio XE for Linux
Auto Parallel: No
File System: ext4

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L3 Cache:	20 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:	1 x 300 GB 10 K SAS	Other Software:	HP Array Configuration Utility CLI 9.0-16.0
Other Hardware:	None		

Results Table

	Base						Peak						
Benchmark	**Copies**	**Seconds**	**Ratio**	**Seconds**	**Ratio**	**Seconds**	**Ratio**	**Copies**	**Seconds**	**Ratio**	**Seconds**	**Ratio**	**Seconds**	**Ratio**
410.bwaves	64	1338	650	**1337**	**651**	1336	651	64	1338	650	**1337**	**651**	1336	651
416.gamess	64	**1440**	**870**	1439	871	1440	870	64	1422	881	1424	880	**1423**	**881**
433.milc	64	911	645	911	645	**911**	**645**	64	908	647	906	648	**908**	**647**
434.zeusmp	64	618	942	**618**	**942**	620	940	64	618	942	**618**	**942**	620	940
435.gromacs	64	655	698	**661**	**691**	663	690	64	653	699	656	696	**654**	**699**
436.cactusADM	64	707	1080	**701**	**1090**	701	1090	64	707	1080	**701**	**1090**	701	1090
437.leslie3d	64	**1235**	**487**	1234	487	1236	487	32	586	513	**586**	**513**	585	514
444.namd	64	746	688	**746**	**688**	748	686	64	742	691	**738**	**696**	737	697
447.dealII	64	504	1450	499	1470	**499**	**1470**	64	504	1450	499	1470	**499**	**1470**
450.soplex	64	1065	501	**1065**	**501**	1070	499	32	**448**	**596**	448	596	447	597
453.povray	64	291	1170	**292**	**1170**	293	1160	64	253	1350	250	1360	**250**	**1360**
454.calculix	64	**485**	**1090**	485	1090	487	1080	64	**485**	**1090**	485	1090	487	1080
459.GemsFDTD	64	1448	469	1442	471	**1443**	**470**	64	1448	469	1442	471	**1443**	**470**
465.tonto	64	668	942	**667**	**944**	667	944	64	646	974	**646**	**976**	643	980
470.lbm	64	**939**	**936**	939	936	939	937	64	**939**	**936**	939	936	939	937
481.wrf	64	852	839	**851**	**840**	850	841	64	843	848	**840**	**851**	838	853
482.sphinx3	64	**1710**	**730**	1709	730	1712	729	64	**1710**	**730**	1709	730	1712	729

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/redhat_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>
Drive Write Cache set to Enabled in HP Array Configuration Utility, CLI version

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Operating System Notes (Continued)

Accelerator Ratio for Reads/Writes set to = 100% Read / 0% Write in HP Array Configuration Utility, CLI version

Platform Notes

```
    BIOS Configuration:
     HP Power Profile set to Maximum Performance
     Energy/Performance Bias is set to Maximum Performance
     Memory Power Savings Mode 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 BL660c Sat Sep 15 18:04:34 2012

    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 E5-4640 0 @ 2.40GHz
          4 "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 : 8
          siblings  : 16
          physical 0: cores 0 1 2 3 4 5 6 7
          physical 1: cores 0 1 2 3 4 5 6 7
          physical 2: cores 0 1 2 3 4 5 6 7
          physical 3: cores 0 1 2 3 4 5 6 7
       cache size : 20480 KB

    From /proc/meminfo
       MemTotal:        264485280 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 BL660c 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
```

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Platform Notes (Continued)

```
   run-level 3 Sep 15 03:50

   SPEC is set to: /cpu2006
      Filesystem     Type    Size  Used Avail Use% Mounted on
      /dev/sda3      ext4    273G   14G  246G   6% /

   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:
LD_LIBRARY_PATH = "/cpu2006/libs/32:/cpu2006/libs/64"


 Binaries compiled on a system with 2x Xeon E5-2677 CPU + 256GB
 memory using SLES11 SP2,RC3
```

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
```

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Base Portability Flags (Continued)

```
   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:
```
-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
```

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Peak 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
      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: basepeak = yes
```

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Peak Optimization Flags (Continued)

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

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: basepeak = yes

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

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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