SPEC® CFP2006 Result
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Hewlett-Packard Company

ProLiant BL660c Gen8
(2.60 GHz, Intel Xeon E5-4620 v2)

$SPECfp^{\circledR}_rate2006 = $ 1020

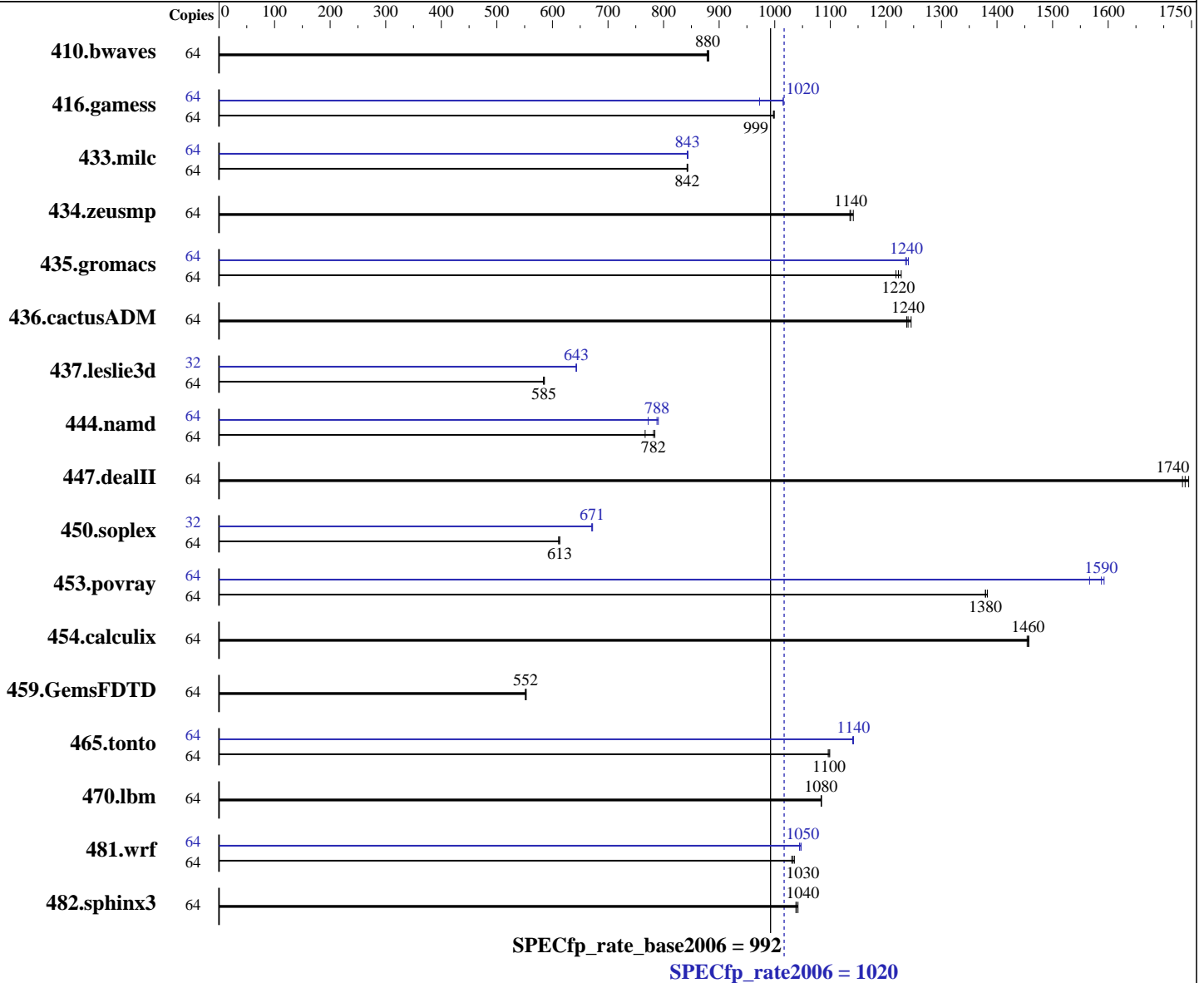$SPECfp_rate_base2006 = $ 992

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

Test date: Feb-2014
Hardware Availability: Mar-2014
Software Availability: Sep-2013

Copies					
410.bwaves	64			880	
416.gamess	64		1020		
	64		999		
433.milc	64		843		
	64		842		
434.zeusmp	64			1140	
435.gromacs	64			1240	
	64			1220	
436.cactusADM	64			1240	
437.leslie3d	32		643		
	64		585		
444.namd	64		788		
	64		782		
447.dealII	64				1740
450.soplex	32		671		
	64		613		
453.povray	64				1590
	64			1380	
454.calculix	64			1460	
459.GemsFDTD	64		552		
465.tonto	64			1140	
	64		1100		
470.lbm	64		1080		
481.wrf	64		1050		
	64		1030		
482.sphinx3	64		1040		

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Hardware

CPU Name:	Intel Xeon E5-4620 v2
CPU Characteristics:	Intel Turbo Boost Technology up to 3.00 GHz
CPU MHz:	2600
FPU:	Integrated
CPU(s) enabled:	32 cores, 4 chips, 8 cores/chip, 2 threads/core
CPU(s) orderable:	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 6.4, (Santiago) Kernel 2.6.32-358.el6.x86_64
Compiler:	C/C++: Version 14.0.0.080 of Intel C++ Studio XE for Linux; Fortran: Version 14.0.0.080 of Intel Fortran Studio XE for Linux
Auto Parallel:	No
File System:	ext4

Continued on next page

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L3 Cache:	20 MB I+D on chip per chip
Other Cache:	None
Memory:	256 GB (32 x 8 GB 2Rx4 PC3-14900R-13, ECC, running at 1600 MHz and CL11)
Disk Subsystem:	1 x 300 GB 15 K SAS, RAID 0
Other Hardware:	None

System State:	Run level 3 (multi-user)
Base Pointers:	32/64-bit
Peak Pointers:	32/64-bit
Other Software:	None

Results Table

Benchmark	Base Copies	Base Seconds	Base Ratio	Base Seconds	Base Ratio	Base Seconds	Base Ratio	Peak Copies	Peak Seconds	Peak Ratio	Peak Seconds	Peak Ratio	Peak Seconds	Peak Ratio
410.bwaves	64	987	881	990	878	**989**	**880**	64	987	881	990	878	**989**	**880**
416.gamess	64	**1255**	**999**	1254	999	1256	998	64	**1234**	**1020**	1288	973	1234	1020
433.milc	64	698	842	696	844	**697**	**842**	64	697	843	696	844	**697**	**843**
434.zeusmp	64	**512**	**1140**	513	1140	510	1140	64	**512**	**1140**	513	1140	510	1140
435.gromacs	64	372	1230	**374**	**1220**	375	1220	64	**369**	**1240**	368	1240	370	1240
436.cactusADM	64	**617**	**1240**	618	1240	614	1250	64	**617**	**1240**	618	1240	614	1250
437.leslie3d	64	1031	584	1027	586	**1029**	**585**	32	468	643	468	643	**468**	**643**
444.namd	64	669	767	654	784	**656**	**782**	64	665	772	649	791	**651**	**788**
447.dealII	64	420	1740	422	1730	**421**	**1740**	64	420	1740	422	1730	**421**	**1740**
450.soplex	64	**871**	**613**	874	611	871	613	32	**398**	**671**	397	672	398	671
453.povray	64	246	1380	247	1380	**247**	**1380**	64	214	1590	**214**	**1590**	217	1570
454.calculix	64	363	1450	**363**	**1460**	362	1460	64	363	1450	**363**	**1460**	362	1460
459.GemsFDTD	64	**1230**	**552**	1228	553	1232	551	64	**1230**	**552**	1228	553	1232	551
465.tonto	64	574	1100	**574**	**1100**	573	1100	64	**552**	**1140**	552	1140	552	1140
470.lbm	64	812	1080	**812**	**1080**	811	1080	64	812	1080	**812**	**1080**	811	1080
481.wrf	64	690	1040	**692**	**1030**	694	1030	64	684	1040	682	1050	**684**	**1050**
482.sphinx3	64	1197	1040	1202	1040	**1200**	**1040**	64	1197	1040	1202	1040	**1200**	**1040**

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>

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Operating System Notes (Continued)

Disabled unused Linux services through "stop_services.sh" before running.

Platform Notes

```
BIOS Configuration:
 HP Power Profile set to Maximum Performance
 Memory Power Savings Mode set to Maximum Performance
 Collaborative Power Control set to Disabled
 Thermal Configuration set to Maximum Cooling
 Processor Power and Utilization Monitoring set to Disabled
 Memory Refresh Rate set to 1x

Sysinfo program /cpu2006/config/sysinfo.rev6818
$Rev: 6818 $ $Date:: 2012-07-17 #$ e86d102572650a6e4d596a3cee98f191
running on BL660-gen8 Tue Feb 25 06:39:22 2014

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 E5-4620 v2 @ 2.60GHz
      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:       264633624 kB
   HugePages_Total:        0
   Hugepagesize:        2048 kB

/usr/bin/lsb_release -d
   Red Hat Enterprise Linux Server release 6.4 (Santiago)

From /etc/*release* /etc/*version*
   redhat-release: Red Hat Enterprise Linux Server release 6.4 (Santiago)
   system-release: Red Hat Enterprise Linux Server release 6.4 (Santiago)
   system-release-cpe: cpe:/o:redhat:enterprise_linux:6server:ga:server

uname -a:
   Linux BL660-gen8 2.6.32-358.el6.x86_64 #1 SMP Tue Jan 29 11:47:41 EST 2013
   x86_64 x86_64 x86_64 GNU/Linux
```

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Platform Notes (Continued)

```
 run-level 3 Feb 24 18:36

 SPEC is set to: /cpu2006
    Filesystem     Type    Size  Used Avail Use% Mounted on
    /dev/sda3      ext4    273G   68G  192G  27% /

 Additional information from dmidecode:
   BIOS HP I32 02/02/2014
   Memory:
    32x HP 712382-071 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:/cpu2006/sh"

 Binaries compiled on a system with 1x Core i7-860 CPU + 8GB
 memory using RedHat EL 6.4
```

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 -opt-prefetch -auto-p32 -ansi-alias
-opt-mem-layout-trans=3
```

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

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

Benchmarks using both Fortran and C:
```
-xAVX -ipo -O3 -no-prec-div -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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Software Availability: Sep-2013

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)  -opt-mem-layout-trans=3(pass 2)
              -prof-use(pass 2)  -auto-ilp32

    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)  -opt-mem-layout-trans=3(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)  -opt-mem-layout-trans=3(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)  -opt-mem-layout-trans=3(pass 2)
              -prof-use(pass 2)  -unroll4  -ansi-alias
```

Fortran benchmarks:

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Peak Optimization Flags (Continued)

410.bwaves: basepeak = yes

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-

434.zeusmp: basepeak = yes

437.leslie3d: -xAVX -ipo -O3 -no-prec-div -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) -opt-mem-layout-trans=3(pass 2)
-prof-use(pass 2) -opt-prefetch -auto-ilp32

436.cactusADM: basepeak = yes

454.calculix: basepeak = yes

481.wrf: -xAVX -ipo -O3 -no-prec-div -auto-ilp32

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2006/flags/Intel-ic14.0-official-linux64.20140128.html
http://www.spec.org/cpu2006/flags/HP-Platform-Flags-Intel-V1.2-revD.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/Intel-ic14.0-official-linux64.20140128.xml
http://www.spec.org/cpu2006/flags/HP-Platform-Flags-Intel-V1.2-revD.xml

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

Tested with SPEC CPU2006 v1.2.
Report generated on Thu Jul 24 23:03:17 2014 by SPEC CPU2006 PS/PDF formatter v6932.
Originally published on 20 May 2014.