SPEC® CFP2006 Result
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Hewlett-Packard Company

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

$SPECfp®_rate2006 = $ **1020**

$SPECfp_rate_base2006 = $ **991**

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

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

Copies

Benchmark	Copies	Result
410.bwaves	64	879
416.gamess	64	1020
416.gamess	64	997
433.milc	64	843
433.milc	64	842
434.zeusmp	64	1140
435.gromacs	64	1230
435.gromacs	64	1220
436.cactusADM	64	1240
437.leslie3d	32	640
437.leslie3d	64	584
444.namd	64	789
444.namd	64	768
447.dealII	64	1750
450.soplex	32	670
450.soplex	64	612
453.povray	64	1580
453.povray	64	1360
454.calculix	64	1460
459.GemsFDTD	64	551
465.tonto	64	1140
465.tonto	64	1090
470.lbm	64	1080
481.wrf	64	1040
481.wrf	64	1030
482.sphinx3	64	1040

SPECfp_rate_base2006 = 991
SPECfp_rate2006 = 1020

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

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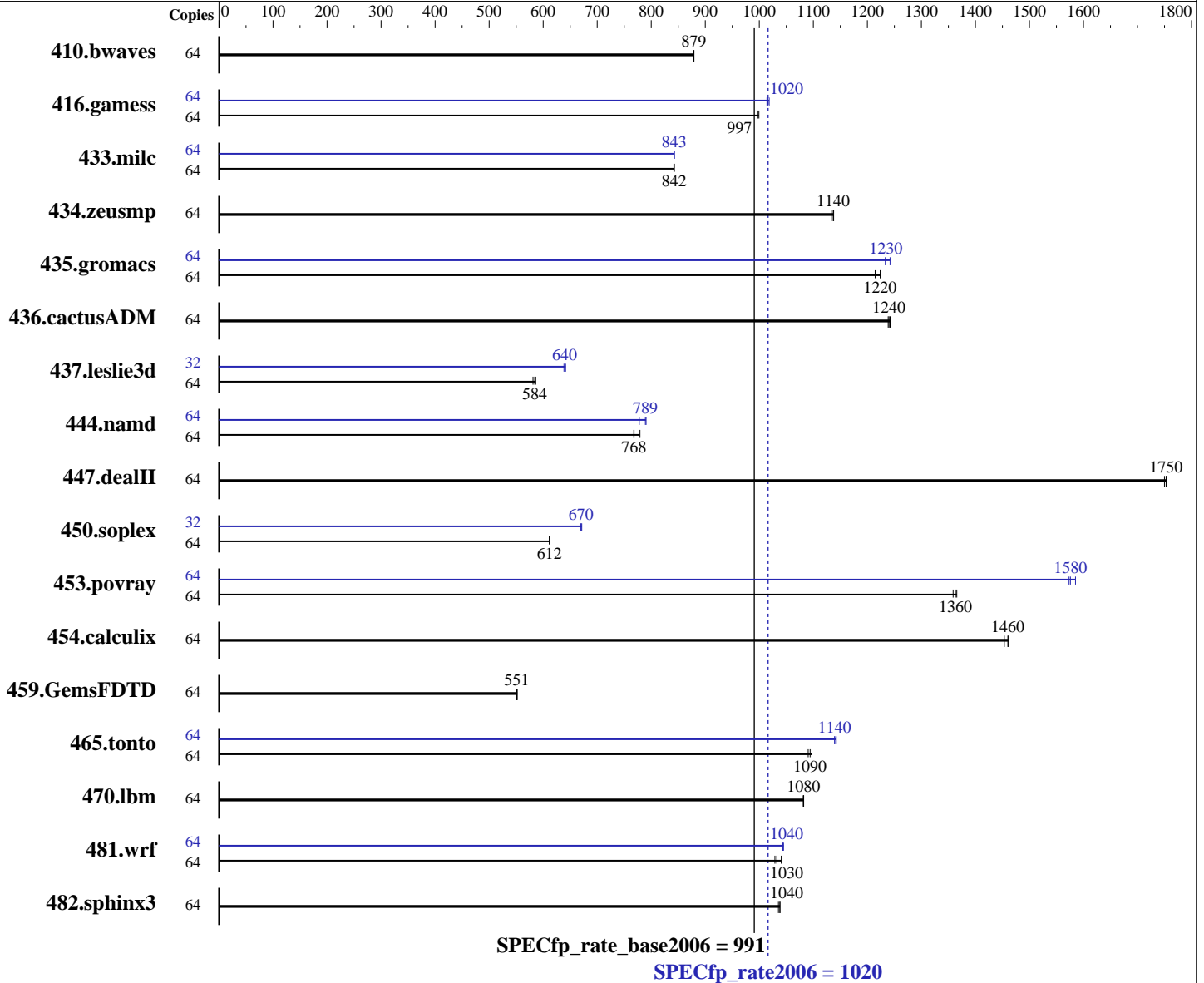|	
CPU2006 license: 3	**Test date:** May-2014
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L3 Cache:	20 MB I+D on chip per chip	System State:	Run level 3 (multi-user)
Other Cache:	None	Base Pointers:	32/64-bit
Memory:	256 GB (32 x 8 GB 2Rx4 PC3-12800R-11, ECC)	Peak Pointers:	32/64-bit
Disk Subsystem:	2 x 300 GB 15 K SAS, RAID 1	Other Software:	None
Other Hardware:	None		

Results Table

| Benchmark | Base | | | | | | | Peak | | | | | | |
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	64	991	878	989	879	**989**	**879**	64	991	878	989	879	**989**	**879**
416.gamess	64	**1257**	**997**	1254	999	1258	996	64	**1234**	**1020**	1231	1020	1236	1010
433.milc	64	697	843	**697**	**842**	698	842	64	697	842	697	843	**697**	**843**
434.zeusmp	64	**512**	**1140**	514	1130	512	1140	64	**512**	**1140**	514	1130	512	1140
435.gromacs	64	**373**	**1220**	373	1220	376	1210	64	371	1230	**370**	**1230**	368	1240
436.cactusADM	64	**617**	**1240**	616	1240	618	1240	64	**617**	**1240**	616	1240	618	1240
437.leslie3d	64	1035	581	1026	586	**1029**	**584**	32	469	642	**470**	**640**	471	638
444.namd	64	**668**	**768**	669	768	659	779	64	**650**	**789**	660	778	649	790
447.dealII	64	**418**	**1750**	418	1750	418	1750	64	**418**	**1750**	418	1750	418	1750
450.soplex	64	873	611	872	612	**873**	**612**	32	**398**	**670**	398	670	397	671
453.povray	64	251	1360	**250**	**1360**	249	1370	64	215	1590	**216**	**1580**	216	1570
454.calculix	64	**362**	**1460**	361	1460	363	1450	64	**362**	**1460**	361	1460	363	1450
459.GemsFDTD	64	**1232**	**551**	1230	552	1232	551	64	**1232**	**551**	1230	552	1232	551
465.tonto	64	578	1090	**576**	**1090**	574	1100	64	551	1140	**553**	**1140**	553	1140
470.lbm	64	813	1080	**813**	**1080**	813	1080	64	813	1080	**813**	**1080**	813	1080
481.wrf	64	687	1040	**692**	**1030**	695	1030	64	684	1040	685	1040	**685**	**1040**
482.sphinx3	64	1205	1040	**1202**	**1040**	1201	1040	64	1205	1040	**1202**	**1040**	1201	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

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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Platform Notes

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

 Sysinfo program /home/cpu/config/sysinfo.rev6818
 $Rev: 6818 $ $Date:: 2012-07-17 #$ e86d102572650a6e4d596a3cee98f191
 running on PL18_BL660c Thu May  1 01:33:51 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:       264485148 kB
    HugePages_Total:        0
    Hugepagesize:        2048 kB

 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 PL18_BL660c 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

 run-level 3 Apr 30 13:13

 SPEC is set to: /home/cpu
    Filesystem      Type    Size  Used Avail Use% Mounted on
    /dev/mapper/vg_pl18_bl660c-lv_home
                    ext4    222G   63G  148G  30% /home
```

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Platform Notes (Continued)

```
  Additional information from dmidecode:
    BIOS HP I32 12/20/2013
    Memory:
    32x HP 689911-071 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 = "/home/cpu/libs/32:/home/cpu/libs/64:/home/cpu/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
       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
```

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Base Portability Flags (Continued)

```
      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
```

Peak Portability Flags

```
    410.bwaves: -DSPEC_CPU_LP64
    416.gamess: -DSPEC_CPU_LP64
      433.milc: -DSPEC_CPU_LP64
    434.zeusmp: -DSPEC_CPU_LP64
```

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Peak Portability Flags (Continued)

```
    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:

```
    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-
```

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Peak Optimization Flags (Continued)

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.

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