Hewlett-Packard Company

HP Integrity Superdome X
(120 core, 2.80 GHz, Intel Xeon E7-2890 v2)

$SPECfp®\_rate2006 =$ 3470

$SPECfp\_rate\_base2006 =$ 3390
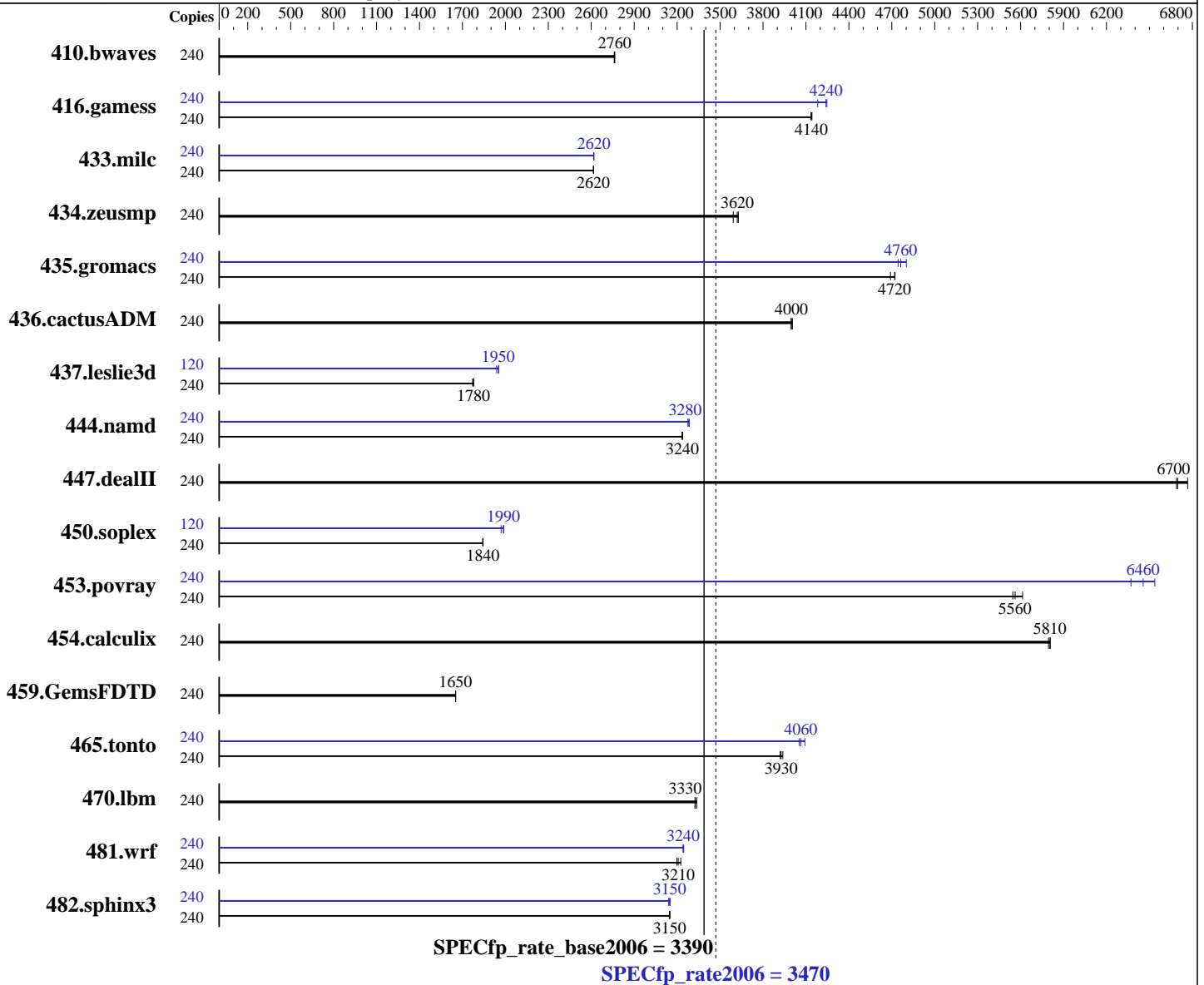
CPU2006 license: 3

Test sponsor: Hewlett-Packard Company

Tested by: Hewlett-Packard Company

Test date: Sep-2014

Hardware Availability: Dec-2014

Software Availability: Jul-2014

Copies	Benchmark	Result
240	410.bwaves	2760
240	416.gamess	4240
240	416.gamess	4140
240	433.milc	2620
240	433.milc	2620
240	434.zeusmp	3620
240	435.gromacs	4760
240	435.gromacs	4720
240	436.cactusADM	4000
120	437.leslie3d	1950
240	437.leslie3d	1780
240	444.namd	3280
240	444.namd	3240
240	447.dealII	6700
120	450.soplex	1990
240	450.soplex	1840
240	453.povray	6460
240	453.povray	5560
240	454.calculix	5810
240	459.GemsFDTD	1650
240	465.tonto	4060
240	465.tonto	3930
240	470.lbm	3330
240	481.wrf	3240
240	481.wrf	3210
240	482.sphinx3	3150
240	482.sphinx3	3150

SPECfp_rate_base2006 = 3390

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Hardware

CPU Name: Intel Xeon E7-2890 v2

CPU Characteristics: Intel Turbo Boost Technology up to 3.40 GHz

CPU MHz: 2800

FPU: Integrated

CPU(s) enabled: 120 cores, 8 chips, 15 cores/chip, 2 threads/core

CPU(s) orderable: 8,16 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: SUSE Linux Enterprise Server 11 (x86_64) SP3 Kernel 3.0.101-0.30-bigsmp

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: tmpfs

System State: Run level 3 (multi-user)

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L3 Cache:	37.5 MB I+D on chip per chip	Base Pointers:	32/64-bit
Other Cache:	None	Peak Pointers:	32/64-bit
Memory:	2 TB (64 x 32 GB 4Rx4 PC3-14900L-13, ECC, running at 1333 MHz)	Other Software:	None
Disk Subsystem:	8 x C8S59A, 900 GB 10K RPM SAS		
Other Hardware:	None		

Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	240	1180	2760	**1180**	**2760**	1182	2760	240	1180	2760	**1180**	**2760**	1182	2760
416.gamess	240	1136	4140	1134	4140	**1135**	**4140**	240	1107	4250	**1108**	**4240**	1124	4180
433.milc	240	843	2610	**842**	**2620**	842	2620	240	**842**	**2620**	841	2620	842	2620
434.zeusmp	240	602	3630	**603**	**3620**	608	3590	240	602	3630	**603**	**3620**	608	3590
435.gromacs	240	**363**	**4720**	363	4720	365	4690	240	361	4740	357	4800	**360**	**4760**
436.cactusADM	240	718	4000	716	4010	**717**	**4000**	240	718	4000	716	4010	**717**	**4000**
437.leslie3d	240	1274	1770	**1269**	**1780**	1268	1780	120	**578**	**1950**	578	1950	582	1940
444.namd	240	595	3240	594	3240	**595**	**3240**	240	586	3290	**587**	**3280**	587	3280
447.dealII	240	406	6770	**410**	**6700**	410	6690	240	406	6770	**410**	**6700**	410	6690
450.soplex	240	1087	1840	1085	1840	**1086**	**1840**	120	504	1990	**504**	**1990**	508	1970
453.povray	240	227	5610	230	5550	**230**	**5560**	240	200	6370	**198**	**6460**	195	6540
454.calculix	240	342	5790	341	5810	**341**	**5810**	240	342	5790	341	5810	**341**	**5810**
459.GemsFDTD	240	1540	1650	**1541**	**1650**	1542	1650	240	1540	1650	**1541**	**1650**	1542	1650
465.tonto	240	600	3940	602	3920	**601**	**3930**	240	577	4090	583	4050	**581**	**4060**
470.lbm	240	**991**	**3330**	992	3320	988	3340	240	**991**	**3330**	992	3320	988	3340
481.wrf	240	**836**	**3210**	838	3200	831	3230	240	827	3240	**827**	**3240**	826	3250
482.sphinx3	240	1485	3150	**1486**	**3150**	1486	3150	240	1485	3150	**1486**	**3150**	1490	3140

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"
intel_idle.max_cstate=1 appended in kernel command line
Power profile set with:
 cpupower -c all frequency-set -g performance
Benchmark installed under /dev/shm/cpu2006 and mount with:
 mount -o bind /dev/shm/cpu2006 /cpu2006
Transparent Huge Pages enabled with:

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CPU2006 license: 3

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Tested by: Hewlett-Packard Company

Test date: Sep-2014

Hardware Availability: Dec-2014

Software Availability: Jul-2014

Operating System Notes (Continued)

```
   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>
```

Platform Notes

```
 Firmware settings:
  Memory RAS Configuration set to Maximum Performance
 Sysinfo program /cpu2006/config/sysinfo.rev6818
 $Rev: 6818 $ $Date:: 2012-07-17 #$ e86d102572650a6e4d596a3cee98f191
 running on hawk036os1 Fri Sep 19 19:20:35 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 E7-2890 v2 @ 2.80GHz
       8 "physical id"s (chips)
       240 "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 : 15
       siblings  : 30
       physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
       physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
       physical 2: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
       physical 3: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
       physical 4: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
       physical 5: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
       physical 6: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
       physical 7: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
    cache size : 38400 KB

 From /proc/meminfo
    MemTotal:        2117767180 kB
    HugePages_Total:        0
    Hugepagesize:        2048 kB

 /usr/bin/lsb_release -d
    SUSE Linux Enterprise Server 11 (x86_64)

 From /etc/*release* /etc/*version*
    SuSE-release:
       SUSE Linux Enterprise Server 11 (x86_64)
       VERSION = 11
       PATCHLEVEL = 3
```

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SPEC CFP2006 Result
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Test sponsor:	Hewlett-Packard Company	**Hardware Availability:**	Dec-2014
Tested by:	Hewlett-Packard Company	**Software Availability:**	Jul-2014

Platform Notes (Continued)

```
  uname -a:
     Linux hawk036os1 3.0.101-0.30-bigsmp #1 SMP Fri May 23 16:16:00 UTC 2014
     (bd1c1f5) x86_64 x86_64 x86_64 GNU/Linux

  run-level 3 Sep 18 19:20 last=S

  SPEC is set to: /cpu2006
     Filesystem      Type   Size  Used Avail Use% Mounted on
     tmpfs           tmpfs 1010G  4.6G 1006G   1% /dev/shm

  Additional information from dmidecode:
    BIOS HP Bundle: 005.050.012 SFW: 014.010.000 05/07/2014
    Memory:
     64x HP HMT84GL7AMR4C-RD 32 GB 1867 MHz
     128x not defined not defined

  (End of data from sysinfo program)
Regarding the sysinfo display about the memory installed, the correct amount of
memory is 2 TB. Also, sysinfo gathered the wrong information from dmidecode about
speed of the DIMMs. The reported 1867 MHz value is the maximum DIMM speed, but
the configured speed is really 1333 MHz. The dmidecode description should have
one line reading as:
 64x HP HMT84GL7AMR4C-RD 32 GB 1333 MHz
```

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
```

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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
      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 (except as noted below):
```
    icc   -m64
```

    482.sphinx3: `icc -m32`

C++ benchmarks (except as noted below):
```
    icpc  -m64
```

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CPU2006 license: 3	**Test date:** Sep-2014
Test sponsor: Hewlett-Packard Company	**Hardware Availability:** Dec-2014
Tested by: Hewlett-Packard Company	**Software Availability:** Jul-2014

Peak Compiler Invocation (Continued)

```
    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
  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
```

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: -xAVX -ipo -O3 -no-prec-div -opt-mem-layout-trans=3
               -unroll2
```

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
```

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Peak Optimization Flags (Continued)

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-

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-revC.html
http://www.spec.org/cpu2006/flags/HP-Platform-Flags-Intel-V1.2-Integrity-revA.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-revC.xml
http://www.spec.org/cpu2006/flags/HP-Platform-Flags-Intel-V1.2-Integrity-revA.xml

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

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