SPEC® CFP2006 Result

Hewlett-Packard Company

ProLiant DL360 Gen9
(2.40 GHz, Intel Xeon E5-2620 v3)

$SPECfp^{®}\_rate2006 =$ 475

$SPECfp\_rate\_base2006 =$ 465
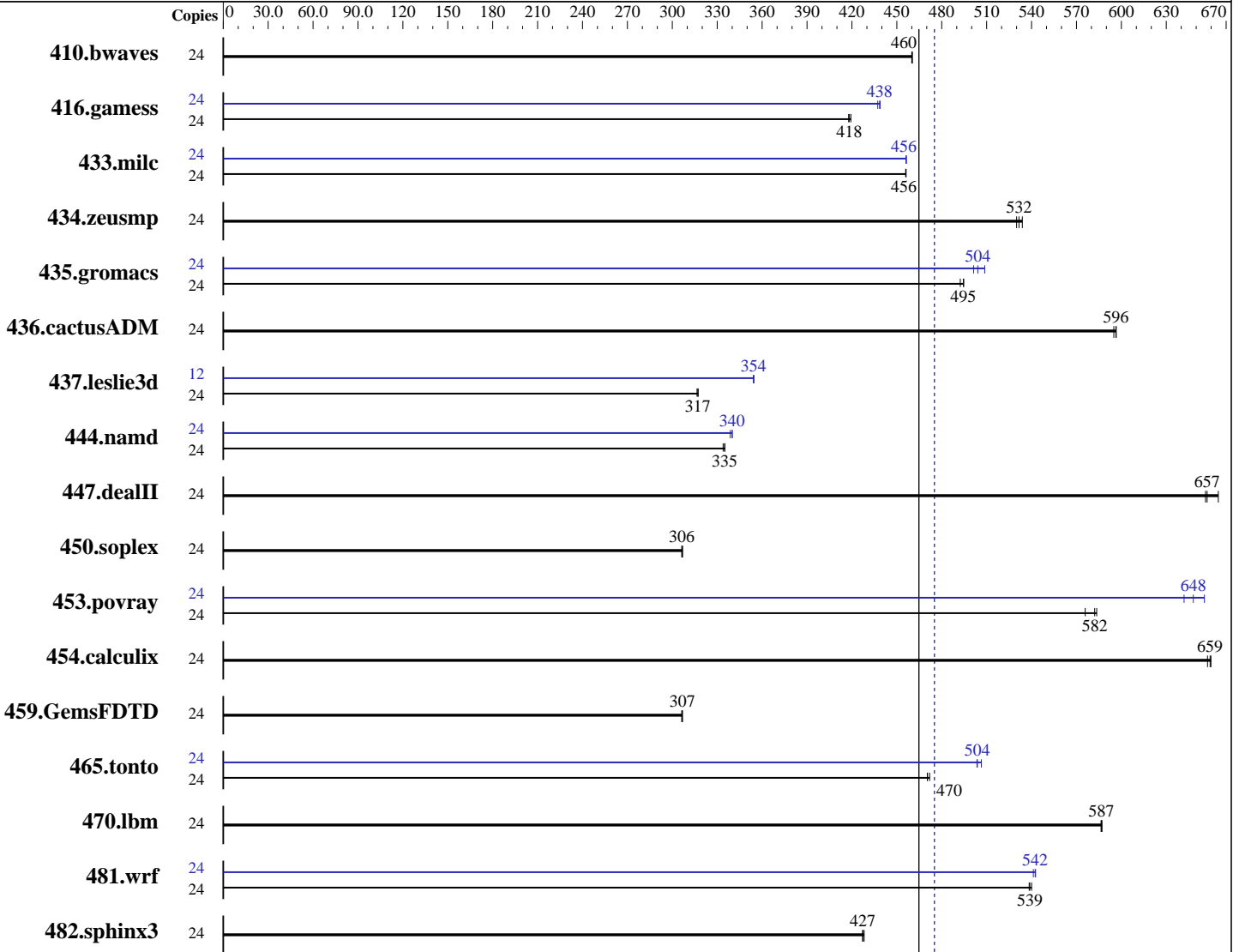
CPU2006 license: 3

Test sponsor: Hewlett-Packard Company

Tested by: Hewlett-Packard Company

Test date: Sep-2014

Hardware Availability: Sep-2014

Software Availability: Sep-2014

Benchmark	Copies	Result
410.bwaves	24	460
416.gamess	24	438
416.gamess	24	418
433.milc	24	456
433.milc	24	456
434.zeusmp	24	532
435.gromacs	24	504
435.gromacs	24	495
436.cactusADM	24	596
437.leslie3d	12	354
437.leslie3d	24	317
444.namd	24	340
444.namd	24	335
447.dealII	24	657
450.soplex	24	306
453.povray	24	648
453.povray	24	582
454.calculix	24	659
459.GemsFDTD	24	307
465.tonto	24	504
465.tonto	24	470
470.lbm	24	587
481.wrf	24	542
481.wrf	24	539
482.sphinx3	24	427

SPECfp_rate_base2006 = 465

SPECfp_rate2006 = 475

Hardware

CPU Name: Intel Xeon E5-2620 v3

CPU Characteristics: Intel Turbo Boost Technology up to 3.20 GHz

CPU MHz: 2400

FPU: Integrated

CPU(s) enabled: 12 cores, 2 chips, 6 cores/chip, 2 threads/core

CPU(s) orderable: 1,2 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 7.0, (Maipo)
Kernel 3.10.0-123.el7.x86_64

Compiler: C/C++: Version 15.0.0.090 of Intel C++ Studio XE for Linux;
Fortran: Version 15.0.0.090 of Intel Fortran Studio XE for Linux

Auto Parallel: No

File System: xfs

Continued on next page

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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 (16 x 16 GB 2Rx4 PC4-2133P-R, running at 1866 MHz)	Peak Pointers:	32/64-bit
		Other Software:	None
Disk Subsystem:	1 x 400 GB SAS SSD, RAID 0		
Other Hardware:	None		

Results Table

Benchmark	Base						Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	24	709	460	709	460	**709**	**460**	24	709	460	709	460	**709**	**460**
416.gamess	24	**1123**	**418**	1121	419	1125	418	24	1075	437	**1072**	**438**	1071	439
433.milc	24	483	456	483	456	**483**	**456**	24	483	456	483	456	**483**	**456**
434.zeusmp	24	409	534	**411**	**532**	412	530	24	409	534	**411**	**532**	412	530
435.gromacs	24	346	495	348	492	**347**	**495**	24	**340**	**504**	342	501	337	509
436.cactusADM	24	482	595	**481**	**596**	481	597	24	482	595	**481**	**596**	481	597
437.leslie3d	24	713	317	**711**	**317**	711	317	12	318	354	**318**	**354**	318	355
444.namd	24	574	335	**575**	**335**	576	334	24	**566**	**340**	566	340	568	339
447.dealII	24	418	656	**418**	**657**	413	665	24	418	656	**418**	**657**	413	665
450.soplex	24	**653**	**306**	653	306	652	307	24	**653**	**306**	653	306	652	307
453.povray	24	**219**	**582**	222	576	219	584	24	195	656	199	642	**197**	**648**
454.calculix	24	**300**	**659**	300	660	301	658	24	**300**	**659**	300	660	301	658
459.GemsFDTD	24	**830**	**307**	830	307	831	306	24	**830**	**307**	830	307	831	306
465.tonto	24	**502**	**470**	500	472	502	470	24	**469**	**504**	466	506	469	504
470.lbm	24	562	587	562	586	**562**	**587**	24	562	587	562	586	**562**	**587**
481.wrf	24	498	538	496	540	**498**	**539**	24	494	543	**494**	**542**	495	541
482.sphinx3	24	1095	427	1092	428	**1095**	**427**	24	1095	427	1092	428	**1095**	**427**

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"
 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
     HP Power Regulator to HP Static High Performance Mode
     Minimum Processor Idle Power Core State set to C6 State
     Minimum Processor Idle Power Package State set to No Package State
     QPI Snoop Configuration set to Cluster on Die
     Thermal Configuration set to Maximum Cooling
     Collaborative Power Control set to Disabled
     Processor Power and Utilization Monitoring set to Disabled
     Memory Double Refresh Rate set to 1x Refresh

    Sysinfo program /home/cpu2006/config/sysinfo.rev6914
    $Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
    running on DL360-Gen9 Mon Sep 29 22:16:36 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 E5-2620 v3 @ 2.40GHz
          2 "physical id"s (chips)
          24 "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
       cache size : 15360 KB

    From /proc/meminfo
       MemTotal:       263845912 kB
       HugePages_Total:        0
       Hugepagesize:        2048 kB

    From /etc/*release* /etc/*version*
       os-release:
          NAME="Red Hat Enterprise Linux Server"
          VERSION="7.0 (Maipo)"
          ID="rhel"
          ID_LIKE="fedora"
          VERSION_ID="7.0"
          PRETTY_NAME="Red Hat Enterprise Linux Server 7.0 (Maipo)"
          ANSI_COLOR="0;31"
          CPE_NAME="cpe:/o:redhat:enterprise_linux:7.0:GA:server"
       redhat-release: Red Hat Enterprise Linux Server release 7.0 (Maipo)
       system-release: Red Hat Enterprise Linux Server release 7.0 (Maipo)
       system-release-cpe: cpe:/o:redhat:enterprise_linux:7.0:ga:server

    uname -a:
```

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Platform Notes (Continued)

```
    Linux DL360-Gen9 3.10.0-123.el7.x86_64 #1 SMP Mon May 5 11:16:57 EDT 2014
    x86_64 x86_64 x86_64 GNU/Linux

  run-level 3 Sep 29 10:36

  SPEC is set to: /home/cpu2006
    Filesystem                      Type  Size  Used Avail Use% Mounted on
    /dev/mapper/rhel_dl360--gen9-home xfs   318G   59G  260G  19% /home
  Additional information from dmidecode:

    Warning: Use caution when you interpret this section. The 'dmidecode' program
    reads system data which is "intended to allow hardware to be accurately
    determined", but the intent may not be met, as there are frequent changes to
    hardware, firmware, and the "DMTF SMBIOS" standard.

    BIOS HP P89 07/11/2014
    Memory:
     16x HP NOT AVAILABLE 16 GB 2 rank 2133 MHz, configured at 1866 MHz
      8x UNKNOWN NOT AVAILABLE

  (End of data from sysinfo program)
Regarding the sysinfo display about the memory installed, the correct amount of
memory is 256 GB and the dmidecode description should have one line reading as:
 16x HP NOT AVAILABLE 16 GB 2 rank 2133 MHz, configured at 1866 MHz
```

General Notes

```
Environment variables set by runspec before the start of the run:
LD_LIBRARY_PATH = "/home/cpu2006/libs/32:/home/cpu2006/libs/64:/home/cpu2006/sh"

 Binaries compiled on a system with 1x Core i5-4670K CPU + 16GB
 memory using RedHat EL 7.0
```

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:
```
-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32
-ansi-alias
```

C++ benchmarks:
```
-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32
-ansi-alias
```

Fortran benchmarks:
```
-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch
```

Benchmarks using both Fortran and C:
```
-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32
-ansi-alias
```

Peak Compiler Invocation

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

C++ benchmarks:
```
icpc  -m64
```

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

Continued on next page

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Peak Compiler Invocation (Continued)

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

Peak Portability Flags

```
Same as Base Portability Flags
```

Peak Optimization Flags

C benchmarks:

```
    433.milc: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)
              -O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2)
              -auto-ilp32

    470.lbm: basepeak = yes

  482.sphinx3: basepeak = yes
```

C++ benchmarks:

```
    444.namd: -xCORE-AVX2(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: basepeak = yes

    453.povray: -xCORE-AVX2(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

    416.gamess: -xCORE-AVX2(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: -xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch
```

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Peak Optimization Flags (Continued)

459.GemsFDTD: basepeak = yes

465.tonto: -xCORE-AVX2(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: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)
-O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2)
-opt-prefetch -auto-ilp32

436.cactusADM: basepeak = yes

454.calculix: basepeak = yes

481.wrf: -xCORE-AVX2 -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-ic15.0-official-linux64.html
http://www.spec.org/cpu2006/flags/HP-Platform-Flags-Intel-V1.2-HSW-revE.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/Intel-ic15.0-official-linux64.xml
http://www.spec.org/cpu2006/flags/HP-Platform-Flags-Intel-V1.2-HSW-revE.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 Tue Oct 21 15:48:56 2014 by SPEC CPU2006 PS/PDF formatter v6932.
Originally published on 21 October 2014.