SPEC® CFP2006 Result
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Hewlett-Packard Company

ProLiant DL360 Gen9
(1.90 GHz, Intel Xeon E5-2609 v3)

$SPECfp^{®}2006 =$ 65.7

$SPECfp\_base2006 =$ 63.6

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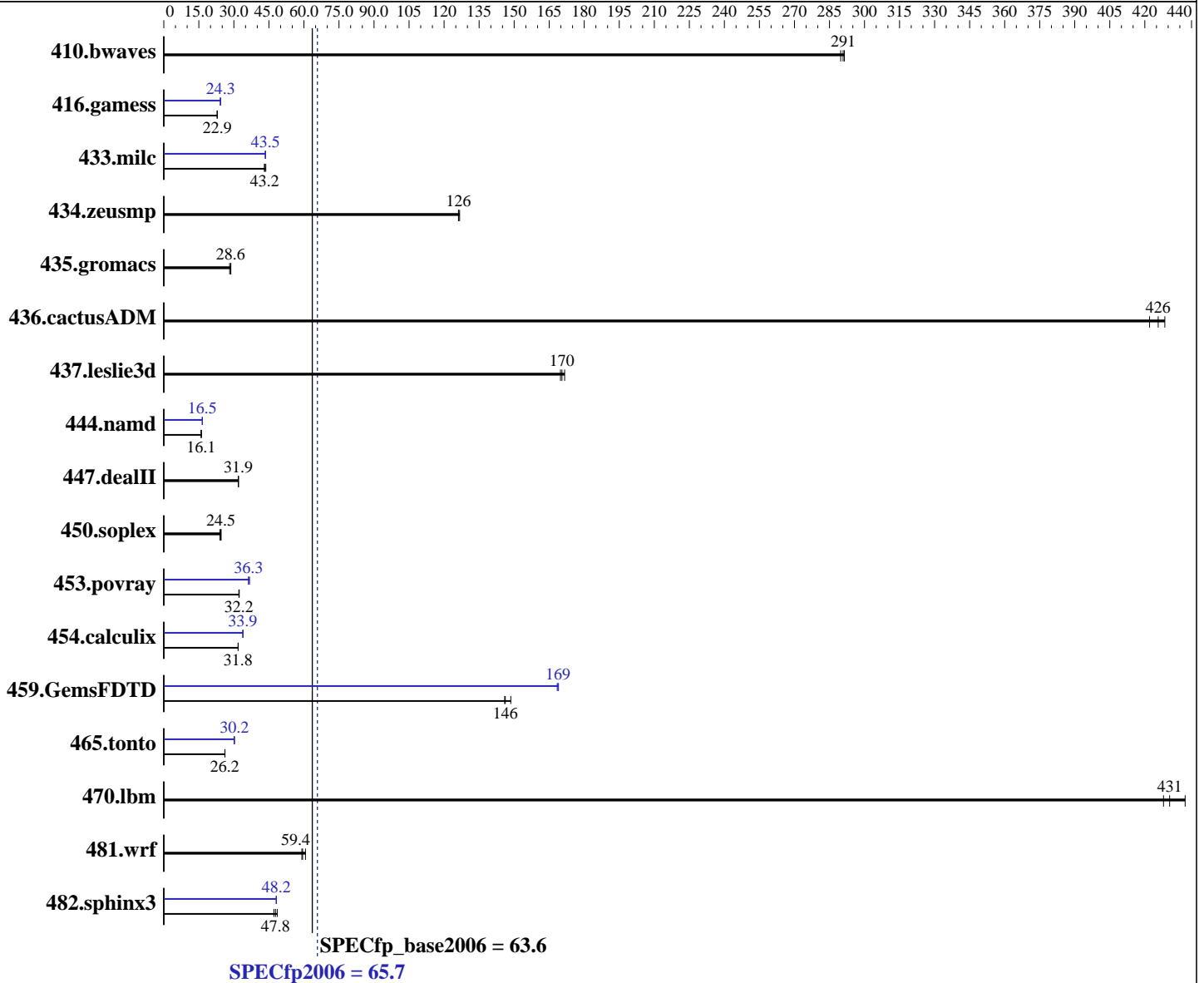**Test sponsor:** Hewlett-Packard Company　　　　　　　　　　　**Hardware Availability:** Sep-2014
Tested by: Hewlett-Packard Company　　　　　　　　　　　　**Software Availability:** Sep-2014

Benchmark results (bar chart):

- 410.bwaves: 291
- 416.gamess: 24.3 / 22.9
- 433.milc: 43.5 / 43.2
- 434.zeusmp: 126
- 435.gromacs: 28.6
- 436.cactusADM: 426
- 437.leslie3d: 170
- 444.namd: 16.5 / 16.1
- 447.dealII: 31.9
- 450.soplex: 24.5
- 453.povray: 36.3 / 32.2
- 454.calculix: 33.9 / 31.8
- 459.GemsFDTD: 169 / 146
- 465.tonto: 30.2 / 26.2
- 470.lbm: 431
- 481.wrf: 59.4
- 482.sphinx3: 48.2 / 47.8

SPECfp_base2006 = 63.6
SPECfp2006 = 65.7

Hardware

CPU Name:	Intel Xeon E5-2609 v3
CPU Characteristics:	
CPU MHz:	1900
FPU:	Integrated
CPU(s) enabled:	12 cores, 2 chips, 6 cores/chip
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:	Yes
File System:	xfs

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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:	64-bit
Memory:	256 GB (16 x 16 GB 2Rx4 PC4-2133P-R, running at 1600 MHz)	Peak Pointers:	32/64-bit
		Other Software:	None
Disk Subsystem:	1 x 400 GB SSA SAS, RAID 0		
Other Hardware:	None		

Results Table

Benchmark	Base Seconds	Base Ratio	Base Seconds	Base Ratio	Base Seconds	Base Ratio	Peak Seconds	Peak Ratio	Peak Seconds	Peak Ratio	Peak Seconds	Peak Ratio
410.bwaves	**46.7**	**291**	46.6	291	46.9	290	**46.7**	**291**	46.6	291	46.9	290
416.gamess	**856**	**22.9**	856	22.9	855	22.9	805	24.3	**807**	**24.3**	810	24.2
433.milc	210	43.7	213	43.1	**213**	**43.2**	211	43.4	211	43.6	**211**	**43.5**
434.zeusmp	72.1	126	**72.1**	**126**	71.9	127	72.1	126	**72.1**	**126**	71.9	127
435.gromacs	253	28.2	**250**	**28.6**	249	28.7	253	28.2	**250**	**28.6**	249	28.7
436.cactusADM	**28.1**	**426**	27.9	429	28.3	422	**28.1**	**426**	27.9	429	28.3	422
437.leslie3d	54.8	172	55.4	170	**55.1**	**170**	54.8	172	55.4	170	**55.1**	**170**
444.namd	**500**	**16.1**	499	16.1	502	16.0	486	16.5	487	16.5	**486**	**16.5**
447.dealII	**358**	**31.9**	358	31.9	358	32.0	**358**	**31.9**	358	31.9	358	32.0
450.soplex	340	24.5	347	24.0	**341**	**24.5**	340	24.5	347	24.0	**341**	**24.5**
453.povray	166	32.1	**165**	**32.2**	165	32.3	**146**	**36.3**	145	36.7	147	36.2
454.calculix	259	31.8	259	31.8	**259**	**31.8**	243	33.9	244	33.8	**244**	**33.9**
459.GemsFDTD	**72.6**	**146**	71.4	149	72.7	146	**62.9**	**169**	63.0	168	62.8	169
465.tonto	**376**	**26.2**	376	26.2	376	26.2	**326**	**30.2**	325	30.3	327	30.1
470.lbm	**31.9**	**431**	32.1	428	31.4	437	**31.9**	**431**	32.1	428	31.4	437
481.wrf	**188**	**59.4**	184	60.7	189	59.1	**188**	**59.4**	184	60.7	189	59.1
482.sphinx3	401	48.6	**408**	**47.8**	414	47.1	405	48.1	**404**	**48.2**	404	48.2

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Operating System Notes

```
Stack size set to unlimited using "ulimit -s unlimited"
 echo always > /sys/kernel/mm/transparent_hugepage/enabled
```

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 Home Snoop
 Thermal Configuration set to Maximum Cooling
 Collaborative Power Control set to Disabled
```

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Hardware Availability: Sep-2014
Software Availability: Sep-2014

Platform Notes (Continued)

```
 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 Tue Sep 23 15:53:41 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 E5-2609 v3 @ 1.90GHz
      2 "physical id"s (chips)
      12 "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  : 6
      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:       263847304 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:
   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 23 15:28

SPEC is set to: /home/cpu2006
   Filesystem                      Type  Size  Used Avail Use% Mounted on
   /dev/mapper/rhel_dl360--gen9-home xfs  318G   34G  285G  11% /home
```

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Platform Notes (Continued)

```
  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 1600 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 1600 MHz
```

General Notes

```
Environment variables set by runspec before the start of the run:
KMP_AFFINITY = "granularity=fine,compact"
LD_LIBRARY_PATH = "/home/cpu2006/libs/32:/home/cpu2006/libs/64:/home/cpu2006/sh"
OMP_NUM_THREADS = "12"

 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
```

Base Portability Flags

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

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Base Portability Flags (Continued)

```
   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 -parallel -opt-prefetch
-ansi-alias
```

C++ benchmarks:

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

Fortran benchmarks:

```
-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -opt-prefetch
```

Benchmarks using both Fortran and C:

```
-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -opt-prefetch
-ansi-alias
```

Peak 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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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 -ansi-alias

      470.lbm: basepeak = yes

    482.sphinx3: -xCORE-AVX2 -ipo -O3 -no-prec-div -unroll2 -ansi-alias
            -parallel

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: basepeak = yes

  459.GemsFDTD: -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 -opt-prefetch -parallel

      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)
            -inline-calloc -opt-malloc-options=3 -auto -unroll4

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Peak Optimization Flags (Continued)

Benchmarks using both Fortran and C:

435.gromacs: basepeak = yes

436.cactusADM: basepeak = yes

454.calculix: -xCORE-AVX2 -ipo -O3 -no-prec-div -auto-ilp32 -ansi-alias

481.wrf: basepeak = yes

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

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