SPEC® CFP2006 Result
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Hewlett-Packard Company

$SPECfp^{®}2006 =$ 66.3

ProLiant DL180 Gen9
(1.90 GHz, Intel Xeon E5-2609 v3)
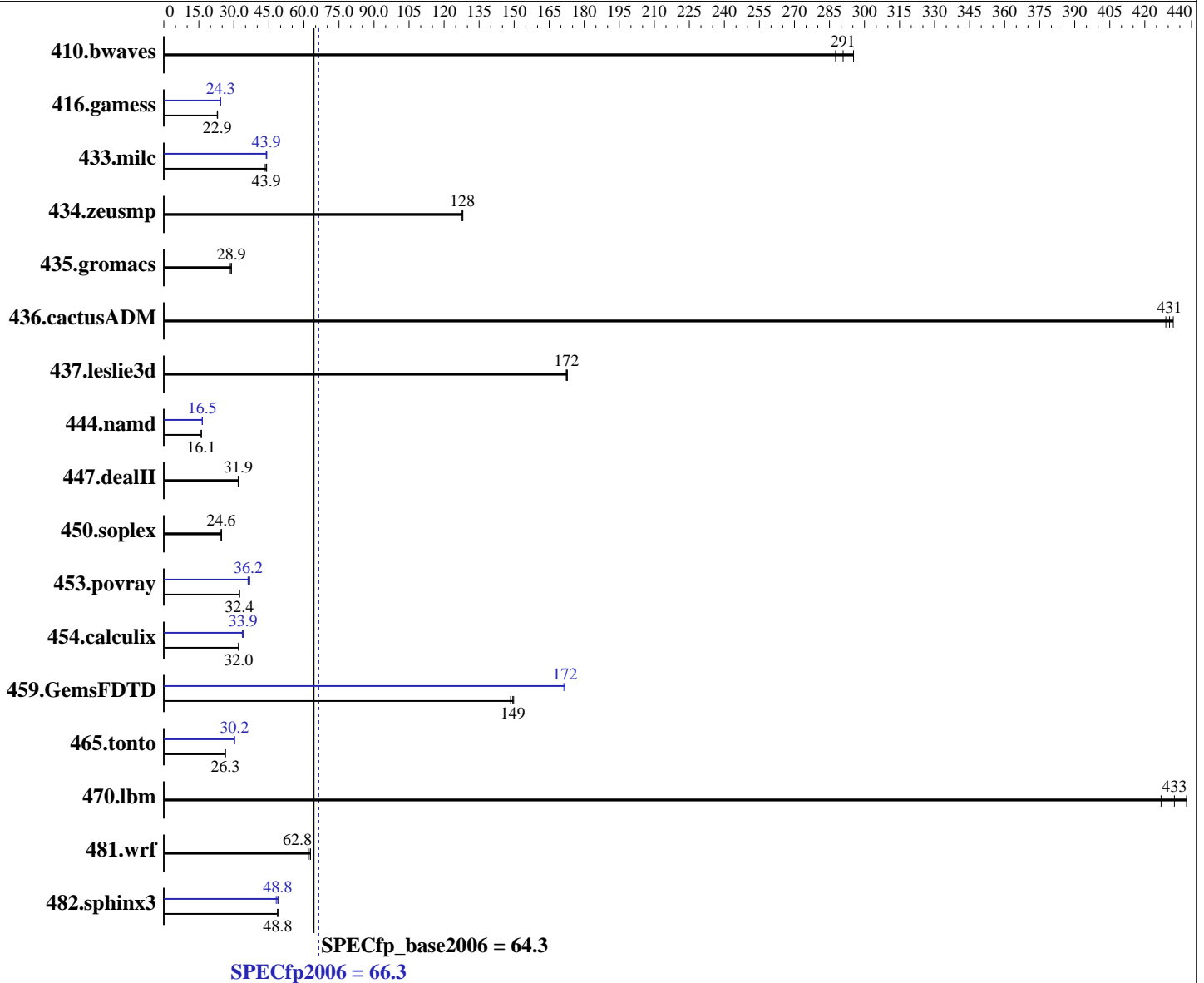
$SPECfp\_base2006 =$ 64.3

CPU2006 license: 3

Test sponsor: Hewlett-Packard Company

Tested by: Hewlett-Packard Company

Test date: Oct-2014

Hardware Availability: Sep-2014

Software Availability: Sep-2014

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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 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 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
Other Cache:	None
Memory:	256 GB (16 x 16 GB 2Rx4 PC4-2133P-R, running at 1600 MHz)
Disk Subsystem:	1 x 400 GB SAS SSD, RAID 0
Other Hardware:	None

System State:	Run level 3 (multi-user)
Base Pointers:	64-bit
Peak Pointers:	32/64-bit
Other Software:	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	46.0	295	47.3	288	**46.7**	**291**	46.0	295	47.3	288	**46.7**	**291**
416.gamess	850	23.0	855	22.9	**854**	**22.9**	808	24.2	**805**	**24.3**	805	24.3
433.milc	**209**	**43.9**	208	44.0	211	43.4	**209**	**43.9**	209	43.9	208	44.1
434.zeusmp	71.2	128	**71.2**	**128**	71.1	128	71.2	128	**71.2**	**128**	71.1	128
435.gromacs	**247**	**28.9**	251	28.5	247	28.9	**247**	**28.9**	251	28.5	247	28.9
436.cactusADM	27.7	432	27.9	429	**27.8**	**431**	27.7	432	27.9	429	**27.8**	**431**
437.leslie3d	54.4	173	54.5	172	**54.5**	**172**	54.4	173	54.5	172	**54.5**	**172**
444.namd	**500**	**16.1**	499	16.1	500	16.0	**486**	**16.5**	486	16.5	486	16.5
447.dealII	359	31.8	358	32.0	**358**	**31.9**	359	31.8	358	32.0	**358**	**31.9**
450.soplex	**340**	**24.6**	337	24.7	344	24.2	**340**	**24.6**	337	24.7	344	24.2
453.povray	164	32.4	**164**	**32.4**	165	32.3	**147**	**36.2**	148	36.1	145	36.8
454.calculix	257	32.0	257	32.1	**257**	**32.0**	**243**	**33.9**	245	33.6	243	34.0
459.GemsFDTD	71.5	148	**71.0**	**149**	70.8	150	61.9	171	61.8	172	**61.8**	**172**
465.tonto	375	26.2	374	26.3	**374**	**26.3**	**326**	**30.2**	325	30.2	326	30.2
470.lbm	32.2	427	**31.8**	**433**	31.4	438	32.2	427	**31.8**	**433**	31.4	438
481.wrf	180	61.9	**178**	**62.8**	178	62.8	180	61.9	**178**	**62.8**	178	62.8
482.sphinx3	399	48.8	**400**	**48.8**	400	48.7	398	48.9	405	48.1	**400**	**48.8**

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"
Transparent Huge Pages enabled with:
 echo always > /sys/kernel/mm/transparent_hugepage/enabled
Filesystem page cache cleared with:
 echo 1 > /proc/sys/vm/drop_caches
```

Platform Notes

```
BIOS Configuration:
 Intel Hyperthreading Options set to Disabled
 HP Power Profile set to Maximum Performance
 QPI Snoop Configuration set to Early Snoop
 Thermal Configuration set to Maximum Cooling
```

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

Platform Notes (Continued)

```
  Processor Power and Utilization Monitoring set to Disabled
  Memory Refresh Rate set to 1x Refresh
 Sysinfo program /home/cpu2006/config/sysinfo.rev6914
 $Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
 running on kokomo-bottom Mon Oct  6 03:42:31 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:       263716444 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 kokomo-bottom 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 Oct 6 03:32

 SPEC is set to: /home/cpu2006
    Filesystem             Type  Size  Used Avail Use% Mounted on
    /dev/mapper/rhel-home xfs   318G  5.7G  313G   2% /home
 Additional information from dmidecode:
```

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Platform Notes (Continued)

```
   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 U20 07/12/2014
   Memory:
   16x HP NOT AVAILABLE 16 GB 2 rank 2133 MHz, configured at 1600 MHz

 (End of data from sysinfo program)
```

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
     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:
```
    -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
```

Peak Portability Flags

```
Same as Base Portability Flags
```

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Test date: Oct-2014
Hardware Availability: Sep-2014
Software Availability: Sep-2014

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`

Benchmarks using both Fortran and C:

> 435.gromacs: `basepeak = yes`

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Peak Optimization Flags (Continued)

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

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

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