SPEC® CFP2006 Result

Hewlett-Packard Company

$SPECfp^{®}2006 =$ 76.2

ProLiant DL580 Gen9
(1.90 GHz, Intel Xeon E7-4820 v3)

$SPECfp\_base2006 =$ 73.3

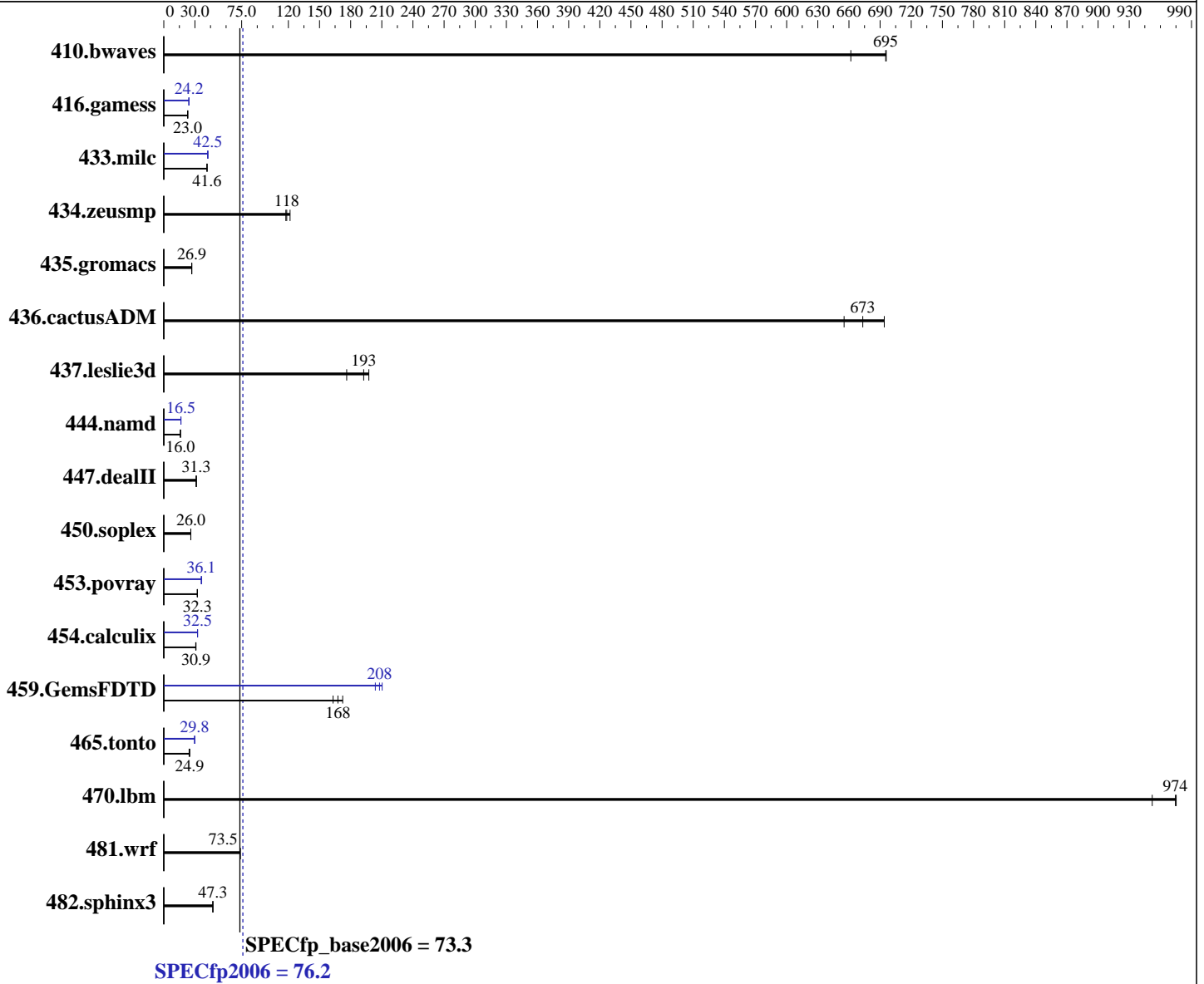|	
CPU2006 license: 3	**Test date:** Jun-2015
Test sponsor: Hewlett-Packard Company	**Hardware Availability:** Jun-2015
Tested by: Hewlett-Packard Company	**Software Availability:** Mar-2015

SPECfp_base2006 = 73.3
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Benchmark	Result
410.bwaves	695
416.gamess	24.2 / 23.0
433.milc	42.5 / 41.6
434.zeusmp	118
435.gromacs	26.9
436.cactusADM	673
437.leslie3d	193
444.namd	16.5 / 16.0
447.dealII	31.3
450.soplex	26.0
453.povray	36.1 / 32.3
454.calculix	32.5 / 30.9
459.GemsFDTD	208 / 168
465.tonto	29.8 / 24.9
470.lbm	974
481.wrf	73.5
482.sphinx3	47.3

Hardware

CPU Name:	Intel Xeon E7-4820 v3
CPU Characteristics:	
CPU MHz:	1900
FPU:	Integrated
CPU(s) enabled:	40 cores, 4 chips, 10 cores/chip
CPU(s) orderable:	2,4 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 7.1 (Maipo) Kernel 3.10.0-229.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:	25 MB I+D on chip per chip
Other Cache:	None
Memory:	512 GB (32 x 16 GB 2Rx4 PC4-2133P-R, running at 1333 MHz)
Disk Subsystem:	2 x 400 GB SAS SSD, RAID 1
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	Ratio	Seconds	Ratio	Seconds	Ratio	Peak Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	**19.5**	**695**	20.5	662	19.5	696	**19.5**	**695**	20.5	662	19.5	696
416.gamess	**850**	**23.0**	850	23.0	849	23.1	810	24.2	**810**	**24.2**	809	24.2
433.milc	**220**	**41.6**	221	41.6	220	41.7	218	42.2	**216**	**42.5**	216	42.5
434.zeusmp	74.8	122	**76.8**	**118**	77.4	118	74.8	122	**76.8**	**118**	77.4	118
435.gromacs	265	26.9	265	26.9	**265**	**26.9**	265	26.9	265	26.9	**265**	**26.9**
436.cactusADM	18.2	655	17.2	694	**17.7**	**673**	18.2	655	17.2	694	**17.7**	**673**
437.leslie3d	53.4	176	**48.8**	**193**	47.6	198	53.4	176	**48.8**	**193**	47.6	198
444.namd	500	16.0	501	16.0	**501**	**16.0**	486	16.5	**487**	**16.5**	487	16.5
447.dealII	365	31.3	366	31.2	**366**	**31.3**	365	31.3	366	31.2	**366**	**31.3**
450.soplex	321	26.0	**320**	**26.0**	320	26.1	321	26.0	**320**	**26.0**	320	26.1
453.povray	164	32.4	**165**	**32.3**	165	32.2	**147**	**36.1**	147	36.1	146	36.5
454.calculix	266	31.0	**267**	**30.9**	268	30.7	254	32.5	**254**	**32.5**	254	32.5
459.GemsFDTD	61.6	172	**63.3**	**168**	65.1	163	50.4	210	**51.1**	**208**	52.1	204
465.tonto	395	24.9	**395**	**24.9**	404	24.4	331	29.7	331	29.8	**331**	**29.8**
470.lbm	14.4	952	**14.1**	**974**	14.1	975	14.4	952	**14.1**	**974**	14.1	975
481.wrf	152	73.6	152	73.5	**152**	**73.5**	152	73.6	152	73.5	**152**	**73.5**
482.sphinx3	**412**	**47.3**	413	47.2	412	47.3	**412**	**47.3**	413	47.2	412	47.3

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
```

Platform Notes

```
BIOS Configuration:
 Intel Hyperthreading set to Disabled
 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
 Energy/Performance Bias set to Maximum Performance
 Collaborative Power Control set to Disabled
```

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Platform Notes (Continued)

```
 Thermal Configuration set to Maximum Cooling
 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 localhost.localdomain Thu Jun 18 10:57:52 2015

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 E7-4820 v3 @ 1.90GHz
      4 "physical id"s (chips)
      40 "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 : 10
      siblings  : 10
      physical 0: cores 0 2 3 4 8 9 10 11 12
      physical 1: cores 0 2 3 4 8 9 10 11 12
      physical 2: cores 0 2 3 4 8 9 10 11 12
      physical 3: cores 0 2 3 4 8 9 10 11 12
   cache size : 25600 KB

From /proc/meminfo
   MemTotal:       528076340 kB
   HugePages_Total:        0
   Hugepagesize:        2048 kB

From /etc/*release* /etc/*version*
   os-release:
      NAME="Red Hat Enterprise Linux Server"
      VERSION="7.1 (Maipo)"
      ID="rhel"
      ID_LIKE="fedora"
      VERSION_ID="7.1"
      PRETTY_NAME="Red Hat Enterprise Linux Server 7.1 (Maipo)"
      ANSI_COLOR="0;31"
      CPE_NAME="cpe:/o:redhat:enterprise_linux:7.1:GA:server"
   redhat-release: Red Hat Enterprise Linux Server release 7.1 (Maipo)
   system-release: Red Hat Enterprise Linux Server release 7.1 (Maipo)
   system-release-cpe: cpe:/o:redhat:enterprise_linux:7.1:ga:server

uname -a:
   Linux localhost.localdomain 3.10.0-229.el7.x86_64 #1 SMP Thu Jan 29 18:37:38
   EST 2015 x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Jun 18 10:48

SPEC is set to: /home/cpu2006
```

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Test sponsor:	Hewlett-Packard Company	**Hardware Availability:**	Jun-2015
Tested by:	Hewlett-Packard Company	**Software Availability:**	Mar-2015

Platform Notes (Continued)

```
     Filesystem             Type   Size  Used Avail Use% Mounted on
     /dev/mapper/rhel-home xfs    318G  6.0G  312G   2% /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 U17 03/13/2015
   Memory:
    32x HP 752369-081 16 GB 2 rank 2133 MHz, configured at 1333 MHz
    64x UNKNOWN NOT AVAILABLE

  (End of data from sysinfo program)
 Regarding the sysinfo display about the memory installed, the correct amount of
 memory is 512 GB and the dmidecode description should have one line reading as:
    32x HP 752369-081 16 GB 2 rank 2133 MHz, configured at 1333 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 = "40"

  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
```

Continued on next page

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Base Portability Flags (Continued)

```
  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 -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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Software Availability: Mar-2015

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: 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: 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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