SPEC® CFP2006 Result
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Hewlett Packard Enterprise
(Test Sponsor: HPE)

ProLiant BL460c Gen10
(2.20 GHz, Intel Xeon Gold 5120)

$SPECfp^{®}2006 =$ **Not Run**
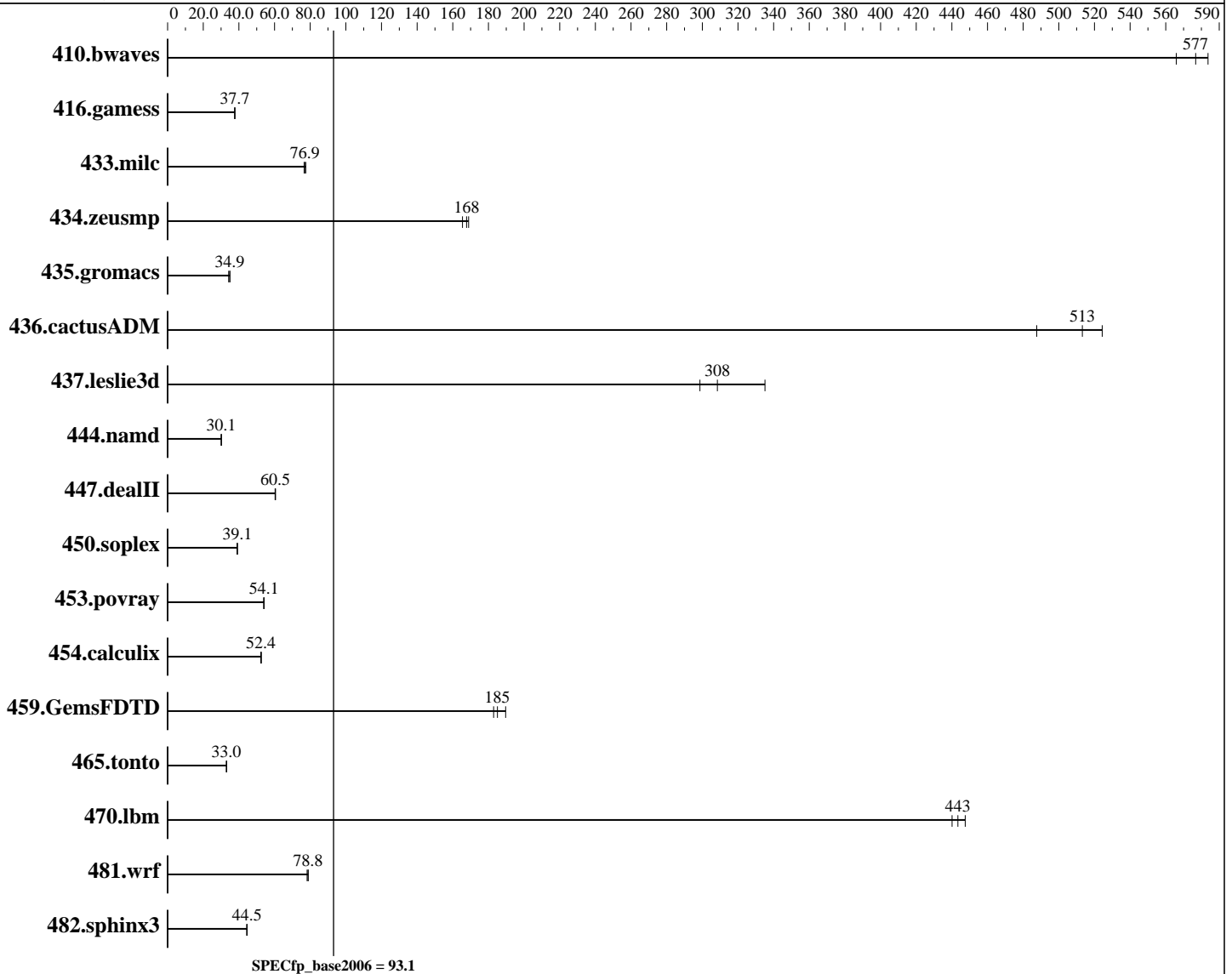
$SPECfp\_base2006 =$ **93.1**

CPU2006 license: 3	**Test date:** Dec-2017
Test sponsor: HPE	**Hardware Availability:** Oct-2017
Tested by: HPE	**Software Availability:** Nov-2016

SPECfp_base2006 = 93.1

410.bwaves	577
416.gamess	37.7
433.milc	76.9
434.zeusmp	168
435.gromacs	34.9
436.cactusADM	513
437.leslie3d	308
444.namd	30.1
447.dealII	60.5
450.soplex	39.1
453.povray	54.1
454.calculix	52.4
459.GemsFDTD	185
465.tonto	33.0
470.lbm	443
481.wrf	78.8
482.sphinx3	44.5

Hardware
CPU Name:	Intel Xeon Gold 5120
CPU Characteristics:	Intel Turbo Boost Technology up to 3.20 GHz
CPU MHz:	2200
FPU:	Integrated
CPU(s) enabled:	28 cores, 2 chips, 14 cores/chip
CPU(s) orderable:	1, 2 chip(s)
Primary Cache:	32 KB I + 32 KB D on chip per core
Secondary Cache:	1 MB I+D on chip per core

Continued on next page

Software
Operating System:	Red Hat Enterprise Linux Server release 7.3 (Maipo) Kernel 3.10.0-514.el7.x86_64
Compiler:	C/C++: Version 17.0.1.132 of Intel C/C++ Compiler for Linux; Fortran: Version 17.0.1.132 of Intel Fortran Compiler for Linux
Auto Parallel:	Yes
File System:	xfs

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L3 Cache:	19.25 MB I+D on chip per chip	System State:	Run level 3 (multi-user)
Other Cache:	None	Base Pointers:	64-bit
Memory:	192 GB (12 x 16 GB 2Rx8 PC4-2666V-R, running at 2400)	Peak Pointers:	Not Applicable
		Other Software:	None
Disk Subsystem:	1 x 480 GB SATA SSD, RAID 0		
Other Hardware:	None		

Results Table

Benchmark	Base						Peak					
	Seconds	**Ratio**	**Seconds**	**Ratio**	**Seconds**	**Ratio**	**Seconds**	**Ratio**	**Seconds**	**Ratio**	**Seconds**	**Ratio**
410.bwaves	23.3	584	24.0	566	**23.6**	**577**						
416.gamess	519	37.7	**519**	**37.7**	520	37.7						
433.milc	**119**	**76.9**	120	76.6	118	77.5						
434.zeusmp	55.0	165	**54.3**	**168**	53.9	169						
435.gromacs	204	34.9	209	34.2	**205**	**34.9**						
436.cactusADM	24.5	488	**23.3**	**513**	22.8	524						
437.leslie3d	31.5	299	28.0	335	**30.5**	**308**						
444.namd	266	30.1	**266**	**30.1**	266	30.1						
447.dealII	**189**	**60.5**	189	60.5	190	60.3						
450.soplex	213	39.1	**213**	**39.1**	214	39.0						
453.povray	98.6	53.9	**98.4**	**54.1**	98.3	54.1						
454.calculix	157	52.6	**157**	**52.4**	158	52.3						
459.GemsFDTD	**57.3**	**185**	58.0	183	55.9	190						
465.tonto	298	33.0	**298**	**33.0**	297	33.1						
470.lbm	31.2	440	**31.0**	**443**	30.7	448						
481.wrf	142	78.8	143	78.3	**142**	**78.8**						
482.sphinx3	437	44.6	439	44.4	**438**	**44.5**						

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 by default
Filesystem page cache cleared with:
shell invocation of 'sync; echo 3 > /proc/sys/vm/drop_caches' prior to run
IRQ balance service was stop using "service irqbalance stop"
Tuned-adm profile was set to Throughtput-Performance
```

Platform Notes

```
BIOS Configuration:
 Intel Hyperthreading set to Disabled
 Thermal Configuration set to Maximum Cooling
 LLC Prefetch set to Enabled
```

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Platform Notes (Continued)

```
   LLC Dead Line Allocation set to Disabled
   Memory Patrol Scrubbing set to Disabled
   Workload Profile set to General Peak Frequency Compute
    Energy/Performance Bias set to Maximum Performance
   Workload Profile set to Custom
    NUMA Group Size Optimization set to Flat
   Sysinfo program /root/cpu2006/config/sysinfo.rev6993
   Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
   running on localhost.localdomain Fri Dec  1 18:35:41 2017

   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) Gold 5120 CPU @ 2.20GHz
         2 "physical id"s (chips)
         28 "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 : 14
         siblings  : 14
         physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
         physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
      cache size : 19712 KB

   From /proc/meminfo
      MemTotal:       197572768 kB
      HugePages_Total:        0
      Hugepagesize:        2048 kB

   From /etc/*release* /etc/*version*
      os-release:
         NAME="Red Hat Enterprise Linux Server"
         VERSION="7.3 (Maipo)"
         ID="rhel"
         ID_LIKE="fedora"
         VERSION_ID="7.3"
         PRETTY_NAME="Red Hat Enterprise Linux Server 7.3 (Maipo)"
         ANSI_COLOR="0;31"
         CPE_NAME="cpe:/o:redhat:enterprise_linux:7.3:GA:server"
      redhat-release: Red Hat Enterprise Linux Server release 7.3 (Maipo)
      system-release: Red Hat Enterprise Linux Server release 7.3 (Maipo)
      system-release-cpe: cpe:/o:redhat:enterprise_linux:7.3:ga:server

   uname -a:
      Linux localhost.localdomain 3.10.0-514.el7.x86_64 #1 SMP Wed Oct 19 11:24:13
      EDT 2016 x86_64 x86_64 x86_64 GNU/Linux

   run-level 3 Dec 1 15:41
```

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Platform Notes (Continued)

```
   SPEC is set to: /root/cpu2006
    Filesystem     Type  Size  Used Avail Use% Mounted on
    /dev/sda4      xfs   442G   28G  415G   7% /
  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 HPE I41 09/29/2017
    Memory:
     4x UNKNOWN NOT AVAILABLE
     12x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2666 MHz, configured at 2400 MHz

  (End of data from sysinfo program)
  Regarding the sysinfo display about the memory installed, the correct amount of
  memory is 192 GB and the dmidecode description should have one line reading as:
     12x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2666 MHz, configured at 2400 MHz
```

General Notes

```
  Environment variables set by runspec before the start of the run:
  KMP_AFFINITY = "granularity=fine,compact,1,0"
  LD_LIBRARY_PATH = "/root/cpu2006/lib/ia32:/root/cpu2006/lib/intel64:/root/cpu2006/sh10.2"
  OMP_NUM_THREADS = "28"

   Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM
   memory using Redhat Enterprise Linux 7.2
```

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-AVX512 -ipo -O3 -no-prec-div -parallel -qopt-prefetch
```

C++ benchmarks:

```
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
```

Fortran benchmarks:

```
-xCORE-AVX512 -ipo -O3 -no-prec-div -parallel -qopt-prefetch
```

Benchmarks using both Fortran and C:

```
-xCORE-AVX512 -ipo -O3 -no-prec-div -parallel -qopt-prefetch
```

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2006/flags/Intel-ic17.0-official-linux64-revF.html
http://www.spec.org/cpu2006/flags/HPE-Platform-Flags-Intel-V1.2-SKX-revH.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/Intel-ic17.0-official-linux64-revF.xml
http://www.spec.org/cpu2006/flags/HPE-Platform-Flags-Intel-V1.2-SKX-revH.xml

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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 Jan 16 12:09:27 2018 by SPEC CPU2006 PS/PDF formatter v6932.
Originally published on 14 January 2018.