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

ProLiant DL360 Gen10
(2.00 GHz, Intel Xeon Platinum 8164)

$SPECfp®\_rate2006 =$ Not Run

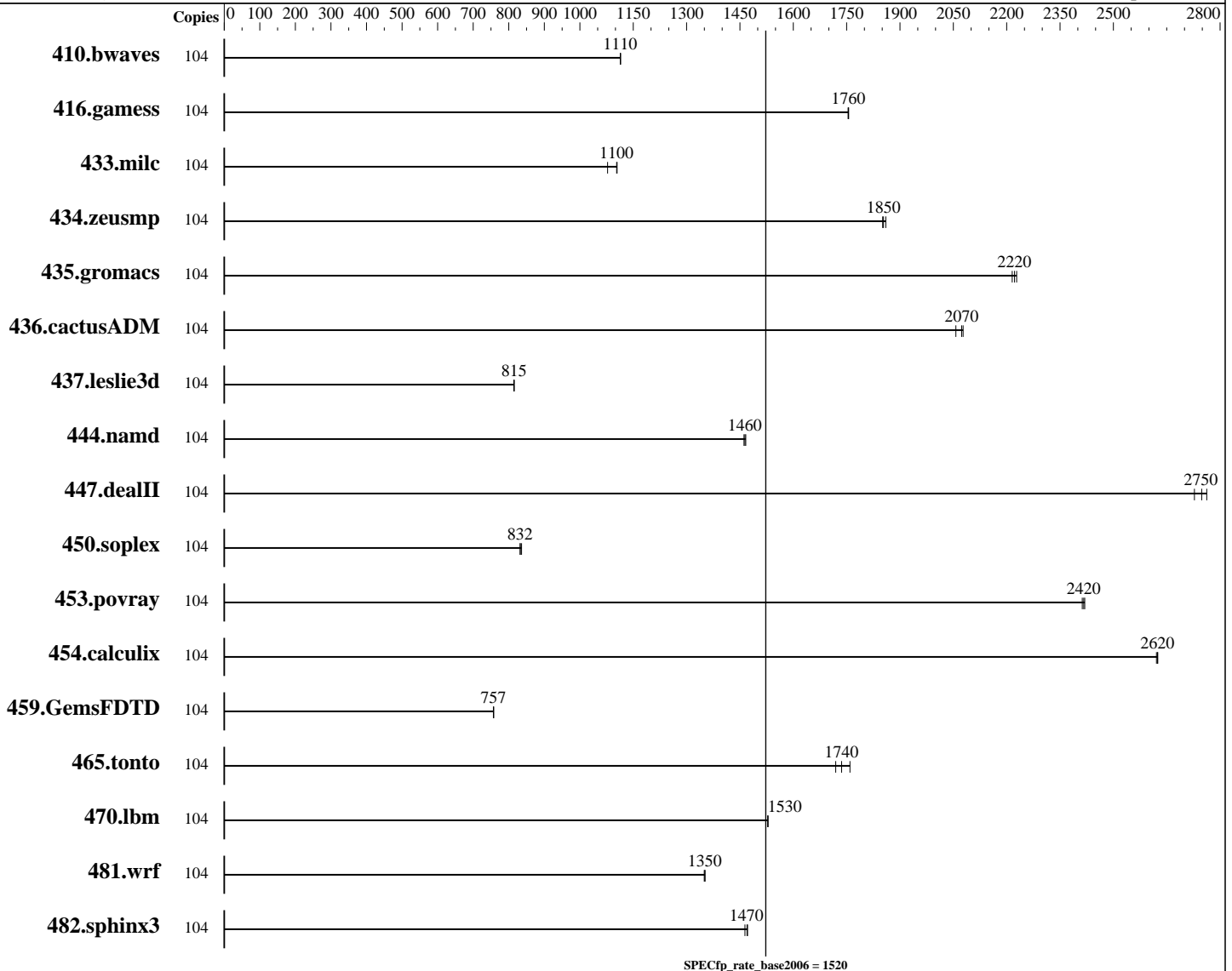$SPECfp\_rate\_base2006 =$ 1520

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

Benchmark	Copies	Result
410.bwaves	104	1110
416.gamess	104	1760
433.milc	104	1100
434.zeusmp	104	1850
435.gromacs	104	2220
436.cactusADM	104	2070
437.leslie3d	104	815
444.namd	104	1460
447.dealII	104	2750
450.soplex	104	832
453.povray	104	2420
454.calculix	104	2620
459.GemsFDTD	104	757
465.tonto	104	1740
470.lbm	104	1530
481.wrf	104	1350
482.sphinx3	104	1470

SPECfp_rate_base2006 = 1520

Hardware

CPU Name:	Intel Xeon Platinum 8164
CPU Characteristics:	Intel Turbo Boost Technology up to 3.70 GHz
CPU MHz:	2000
FPU:	Integrated
CPU(s) enabled:	52 cores, 2 chips, 26 cores/chip, 2 threads/core
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:	SUSE Linux Enterprise Server 12 (x86_64) SP2 Kernel 4.4.21-68-default
Compiler:	C/C++: Version 17.0.3.191 of Intel C/C++ Compiler for Linux; Fortran: Version 17.0.3.191 of Intel Fortran Compiler for Linux
Auto Parallel:	No
File System:	xfs
System State:	Run level 3 (multi-user)

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L3 Cache:	35.75 MB I+D on chip per chip	Base Pointers:	32/64-bit
Other Cache:	None	Peak Pointers:	Not Applicable
Memory:	192 GB (24 x 8 GB 2Rx8 PC4-2666V-R)	Other Software:	None
Disk Subsystem:	1 x 400 GB SATA 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	104	1269	1110	**_1269_**	**_1110_**	1268	1110							
416.gamess	104	**_1160_**	**_1760_**	1160	1760	1161	1750							
433.milc	104	886	1080	864	1100	**_865_**	**_1100_**							
434.zeusmp	104	**_511_**	**_1850_**	511	1850	509	1860							
435.gromacs	104	333	2230	**_334_**	**_2220_**	335	2220							
436.cactusADM	104	604	2060	**_599_**	**_2070_**	598	2080							
437.leslie3d	104	**_1200_**	**_815_**	1201	814	1199	815							
444.namd	104	571	1460	**_570_**	**_1460_**	569	1470							
447.dealII	104	436	2730	**_433_**	**_2750_**	431	2760							
450.soplex	104	1042	832	**_1042_**	**_832_**	1038	836							
453.povray	104	229	2420	**_229_**	**_2420_**	229	2410							
454.calculix	104	327	2620	**_327_**	**_2620_**	327	2620							
459.GemsFDTD	104	1456	758	1458	757	**_1458_**	**_757_**							
465.tonto	104	**_590_**	**_1740_**	595	1720	582	1760							
470.lbm	104	**_935_**	**_1530_**	935	1530	935	1530							
481.wrf	104	859	1350	**_860_**	**_1350_**	861	1350							
482.sphinx3	104	1384	1460	**_1379_**	**_1470_**	1378	1470							

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"
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
runspec command invoked through numactl i.e.:
 numactl --interleave=all runspec <etc>
irqbalance disabled with "service irqbalance stop"
tuned profile set wtih "tuned-adm profile throughput-performance"

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Operating System Notes (Continued)

```
    VM Dirty ratio was set to 40 using "echo 40 > /proc/sys/vm/dirty_ratio"
    Numa balancing was disabled using "echo 0 > /proc/sys/kernel/numa_balancing"
```

Platform Notes

```
  BIOS Configuration:
  Thermal Configuration set to Maximum Cooling
  LLC Prefetch set to Enabled
  LLC Dead Line Allocation set to Disabled
  Memory Patrol Scrubbing set to Disabled
  Workload Profile set to General Throughput Compute
   Minimum Processor Idle Power Core C-State set to C1E
  Sysinfo program /home/cpu2006/config/sysinfo.rev6993
  Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
  running on linux-rugf Thu Oct 26 11:56:28 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) Platinum 8164 CPU @ 2.00GHz
        2 "physical id"s (chips)
        104 "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 : 26
        siblings  : 52
        physical 0: cores 0 1 2 3 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25 26 27
        28 29
        physical 1: cores 0 1 2 3 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25 26 27
        28 29
     cache size : 36608 KB

  From /proc/meminfo
     MemTotal:       197736612 kB
     HugePages_Total:        0
     Hugepagesize:        2048 kB

  From /etc/*release* /etc/*version*
     SuSE-release:
        SUSE Linux Enterprise Server 12 (x86_64)
        VERSION = 12
        PATCHLEVEL = 2
        # This file is deprecated and will be removed in a future service pack or
        release.
        # Please check /etc/os-release for details about this release.
     os-release:
        NAME="SLES"
        VERSION="12-SP2"
```

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Platform Notes (Continued)

```
        VERSION_ID="12.2"
        PRETTY_NAME="SUSE Linux Enterprise Server 12 SP2"
        ID="sles"
        ANSI_COLOR="0;32"
        CPE_NAME="cpe:/o:suse:sles:12:sp2"

  uname -a:
     Linux linux-rugf 4.4.21-68-default #1 SMP Tue Oct 18 18:19:37 UTC 2016
     (63cf368) x86_64 x86_64 x86_64 GNU/Linux

  run-level 3 Oct 26 05:31

  SPEC is set to: /home/cpu2006
     Filesystem      Type  Size  Used Avail Use% Mounted on
     /dev/nvme0n1p4 xfs   331G  115G  216G  35% /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 HPE U32 09/29/2017
   Memory:
   24x UNKNOWN NOT AVAILABLE 8 GB 2 rank 2666 MHz

  (End of data from sysinfo program)
```

General Notes

```
 Environment variables set by runspec before the start of the run:
 LD_LIBRARY_PATH = "/home/cpu2006/lib/ia32:/home/cpu2006/lib/intel64:/home/cpu2006/sh10.2"

  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-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -auto-p32
    -qopt-mem-layout-trans=3
```

C++ benchmarks:
```
    -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -auto-p32
    -qopt-mem-layout-trans=3
```

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

Benchmarks using both Fortran and C:
```
    -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -auto-p32
    -qopt-mem-layout-trans=3
```

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-revF.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-revF.xml

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

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