



SPEC® CFP2006 Result

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Hewlett-Packard Company

SPECfp®2006 = 88.0

ProLiant DL560 Gen9
(1.90 GHz, Intel Xeon E5-4640 v3)

SPECfp_base2006 = 82.9

CPU2006 license: 3

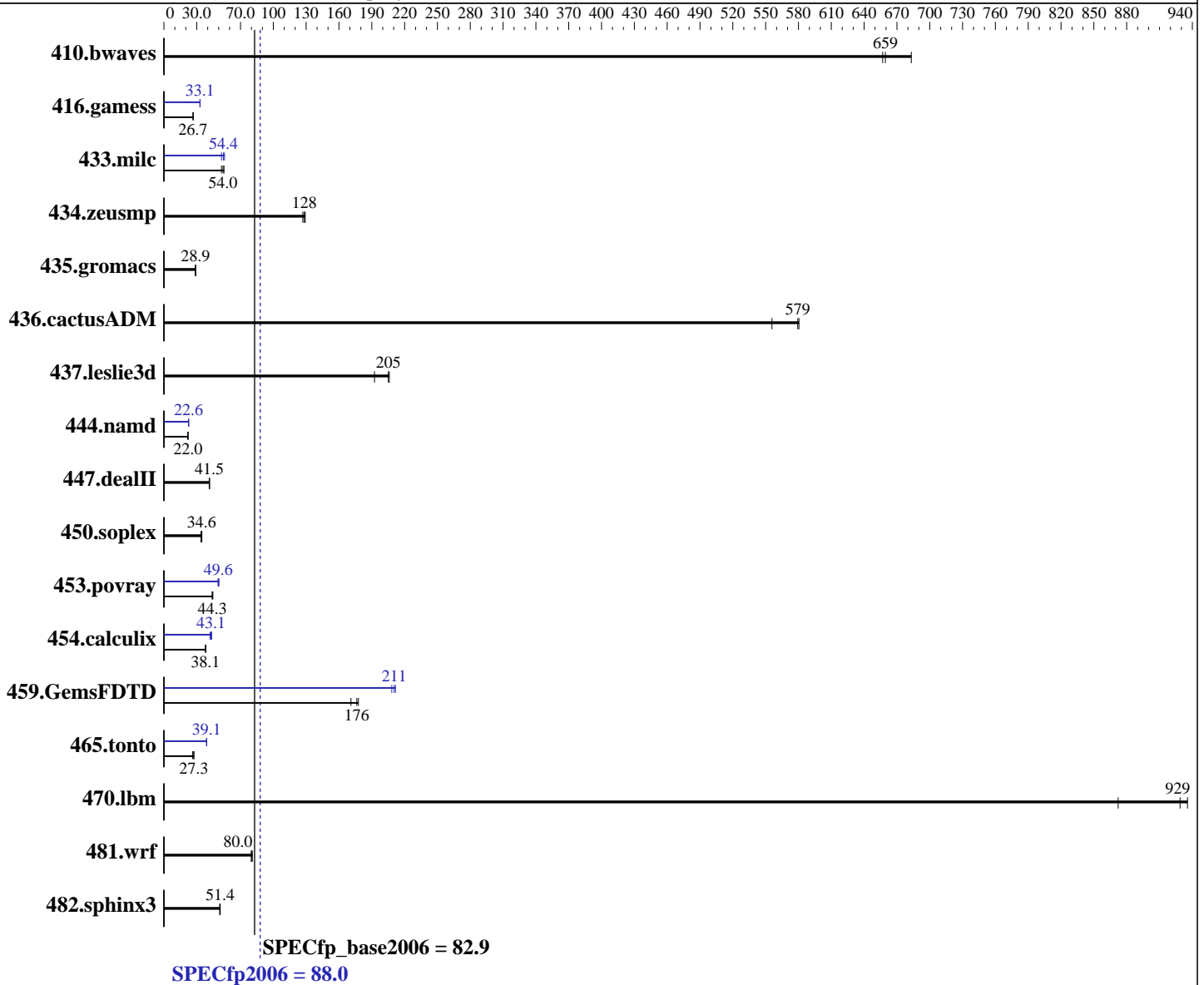
Test date: Jun-2015

Test sponsor: Hewlett-Packard Company

Hardware Availability: Jun-2015

Tested by: Hewlett-Packard Company

Software Availability: Oct-2014



Hardware

CPU Name: Intel Xeon E5-4640 v3
 CPU Characteristics: Intel Turbo Boost Technology up to 2.60 GHz
 CPU MHz: 1900
 FPU: Integrated
 CPU(s) enabled: 48 cores, 4 chips, 12 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: SUSE Linux Enterprise Server 12 (x86_64)
 Kernel 3.12.28-4-default
 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
 System State: Run level 3 (multi-user)

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L3 Cache: 30 MB I+D on chip per chip
Other Cache: None
Memory: 512 GB (32 x 16 GB 2Rx4 PC4-2133P-R, running at 1866 MHz)
Disk Subsystem: 2 x 400 GB SAS SSD, RAID 1
Other Hardware: None

Base Pointers: 64-bit
Peak Pointers: 32/64-bit
Other Software: None

Results Table

Benchmark	Base						Peak					
	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	19.9	683	20.7	657	<u>20.6</u>	<u>659</u>	19.9	683	20.7	657	<u>20.6</u>	<u>659</u>
416.gamess	734	26.7	732	26.7	<u>733</u>	<u>26.7</u>	595	32.9	<u>592</u>	<u>33.1</u>	592	33.1
433.milc	174	52.6	167	54.9	<u>170</u>	<u>54.0</u>	<u>169</u>	<u>54.4</u>	174	52.6	166	55.4
434.zeusmp	<u>70.9</u>	<u>128</u>	71.7	127	70.5	129	<u>70.9</u>	<u>128</u>	71.7	127	70.5	129
435.gromacs	247	28.9	<u>247</u>	<u>28.9</u>	247	28.8	247	28.9	<u>247</u>	<u>28.9</u>	247	28.8
436.cactusADM	<u>20.6</u>	<u>579</u>	20.6	580	21.5	556	<u>20.6</u>	<u>579</u>	20.6	580	21.5	556
437.leslie3d	45.6	206	48.8	192	<u>45.8</u>	<u>205</u>	45.6	206	48.8	192	<u>45.8</u>	<u>205</u>
444.namd	365	22.0	365	22.0	<u>365</u>	<u>22.0</u>	<u>355</u>	<u>22.6</u>	355	22.6	355	22.6
447.dealII	274	41.8	276	41.4	<u>275</u>	<u>41.5</u>	274	41.8	276	41.4	<u>275</u>	<u>41.5</u>
450.soplex	240	34.7	<u>241</u>	<u>34.6</u>	246	33.8	240	34.7	<u>241</u>	<u>34.6</u>	246	33.8
453.povray	119	44.8	<u>120</u>	<u>44.3</u>	120	44.2	<u>107</u>	<u>49.6</u>	106	50.4	107	49.6
454.calculix	<u>216</u>	<u>38.1</u>	217	38.1	216	38.1	196	42.2	<u>192</u>	<u>43.1</u>	189	43.7
459.GemsFDTD	<u>60.2</u>	<u>176</u>	62.1	171	59.7	178	<u>50.4</u>	<u>211</u>	50.1	212	50.9	208
465.tonto	376	26.2	<u>360</u>	<u>27.3</u>	359	27.4	253	38.9	252	39.1	<u>252</u>	<u>39.1</u>
470.lbm	15.8	872	<u>14.8</u>	<u>929</u>	14.7	936	15.8	872	<u>14.8</u>	<u>929</u>	14.7	936
481.wrf	<u>140</u>	<u>80.0</u>	138	80.8	140	79.9	<u>140</u>	<u>80.0</u>	138	80.8	140	79.9
482.sphinx3	<u>379</u>	<u>51.4</u>	382	51.0	379	51.4	<u>379</u>	<u>51.4</u>	382	51.0	379	51.4

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 dl560gen9jks Mon Jun 8 23:20:52 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 E5-4640 v3 @ 1.90GHz
4 "physical id"s (chips)
48 "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      : 12
siblings       : 12
physical 0:    : cores 0 1 2 3 4 5 8 9 10 11 12 13
physical 1:    : cores 0 1 2 3 4 5 8 9 10 11 12 13
physical 2:    : cores 0 1 2 3 4 5 8 9 10 11 12 13
physical 3:    : cores 0 1 2 3 4 5 8 9 10 11 12 13
cache size     : 30720 KB
```

```
From /proc/meminfo
MemTotal:      529311936 kB
HugePages_Total: 0
Hugepagesize:  2048 kB
```

```
/usr/bin/lsb_release -d
SUSE Linux Enterprise Server 12
```

```
From /etc/*release* /etc/*version*
SuSE-release:
SUSE Linux Enterprise Server 12 (x86_64)
VERSION = 12
PATCHLEVEL = 0
# 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"
VERSION_ID="12"
PRETTY_NAME="SUSE Linux Enterprise Server 12"
ID="sles"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:12"
```

uname -a:

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Platform Notes (Continued)

```
Linux dl560gen9jks 3.12.28-4-default #1 SMP Thu Sep 25 17:02:34 UTC 2014
(9879bd4) x86_64 x86_64 x86_64 GNU/Linux
```

```
run-level 3 Jun 8 16:20
```

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

```
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sda4       xfs   331G  6.1G  325G   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 P85 03/05/2015
```

```
Memory:
```

```
24x HP 752369-081 16 GB 2 rank 2133 MHz, configured at 1866 MHz
```

```
16x UNKNOWN NOT AVAILABLE
```

```
8x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2133 MHz, configured at 1866 MHz
```

```
(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 two lines reading as:

```
24x HP 752369-081 16 GB 2 rank 2133 MHz, configured at 1866 MHz
```

```
8x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2133 MHz, configured at 1866 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 = "48"
```

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
```

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Base Compiler Invocation (Continued)

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
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

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Peak Compiler Invocation (Continued)

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

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-

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Peak Optimization Flags (Continued)

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

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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