



SPEC® CFP2006 Result

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Hewlett-Packard Company

SPECfp®2006 = 113

ProLiant ML350 Gen9
(2.6 GHz, Intel Xeon E5-2660 v3)

SPECfp_base2006 = 108

CPU2006 license: 3

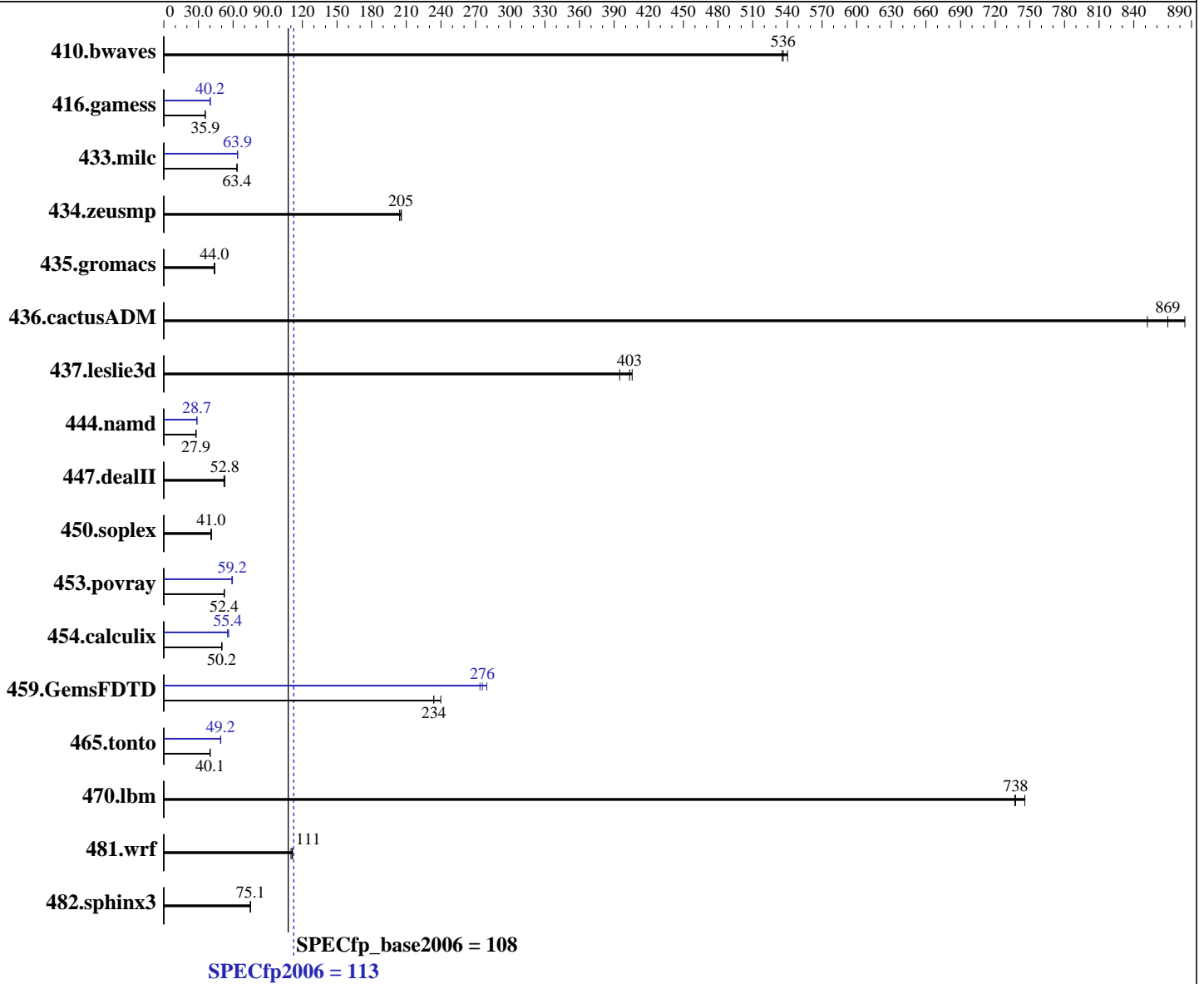
Test date: Apr-2015

Test sponsor: Hewlett-Packard Company

Hardware Availability: Sep-2014

Tested by: Hewlett-Packard Company

Software Availability: Sep-2014



Hardware

CPU Name: Intel Xeon E5-2660 v3
 CPU Characteristics: Intel Turbo Boost Technology up to 3.30 GHz
 CPU MHz: 2600
 FPU: Integrated
 CPU(s) enabled: 20 cores, 2 chips, 10 cores/chip
 CPU(s) orderable: 1,2 chip
 Primary Cache: 32 KB I + 32 KB D on chip per core
 Secondary Cache: 256 KB I+D on chip per core

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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: ext4

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L3 Cache: 25 MB I+D on chip per chip
Other Cache: None
Memory: 256 GB (16 x 16 GB 2Rx4 PC4-2133P-R)
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 | | | | | | Peak | | | | | |
|---------------|------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 410.bwaves | 25.4 | 535 | 25.2 | 540 | <u>25.3</u> | <u>536</u> | 25.4 | 535 | 25.2 | 540 | <u>25.3</u> | <u>536</u> |
| 416.gamess | <u>546</u> | <u>35.9</u> | 545 | 35.9 | 549 | 35.7 | 488 | 40.1 | 487 | 40.2 | <u>487</u> | <u>40.2</u> |
| 433.milc | 145 | 63.5 | <u>145</u> | <u>63.4</u> | 145 | 63.4 | <u>144</u> | <u>63.9</u> | 144 | 64.0 | 144 | 63.7 |
| 434.zeusmp | 44.2 | 206 | 44.6 | 204 | <u>44.3</u> | <u>205</u> | 44.2 | 206 | 44.6 | 204 | <u>44.3</u> | <u>205</u> |
| 435.gromacs | <u>162</u> | <u>44.0</u> | 162 | 44.2 | 164 | 43.6 | <u>162</u> | <u>44.0</u> | 162 | 44.2 | 164 | 43.6 |
| 436.cactusADM | 14.0 | 852 | 13.5 | 884 | <u>13.7</u> | <u>869</u> | 14.0 | 852 | 13.5 | 884 | <u>13.7</u> | <u>869</u> |
| 437.leslie3d | 23.8 | 395 | <u>23.3</u> | <u>403</u> | 23.2 | 406 | 23.8 | 395 | <u>23.3</u> | <u>403</u> | 23.2 | 406 |
| 444.namd | <u>288</u> | <u>27.9</u> | 288 | 27.9 | 288 | 27.9 | <u>280</u> | <u>28.7</u> | 280 | 28.6 | 280 | 28.7 |
| 447.dealII | 220 | 52.0 | <u>217</u> | <u>52.8</u> | 216 | 52.9 | 220 | 52.0 | <u>217</u> | <u>52.8</u> | 216 | 52.9 |
| 450.soplex | 204 | 40.9 | 202 | 41.3 | <u>203</u> | <u>41.0</u> | 204 | 40.9 | 202 | 41.3 | <u>203</u> | <u>41.0</u> |
| 453.povray | 101 | 52.5 | 102 | 52.2 | <u>102</u> | <u>52.4</u> | <u>89.9</u> | <u>59.2</u> | 90.2 | 59.0 | 89.4 | 59.5 |
| 454.calculix | 164 | 50.2 | 164 | 50.3 | <u>164</u> | <u>50.2</u> | 147 | 56.2 | 150 | 55.1 | <u>149</u> | <u>55.4</u> |
| 459.GemsFDTD | 45.4 | 234 | <u>45.4</u> | <u>234</u> | 44.2 | 240 | <u>38.5</u> | <u>276</u> | 37.9 | 280 | 38.7 | 274 |
| 465.tonto | 246 | 40.1 | 245 | 40.1 | <u>245</u> | <u>40.1</u> | 200 | 49.2 | <u>200</u> | <u>49.2</u> | 199 | 49.4 |
| 470.lbm | 18.4 | 746 | <u>18.6</u> | <u>738</u> | 18.6 | 737 | 18.4 | 746 | <u>18.6</u> | <u>738</u> | 18.6 | 737 |
| 481.wrf | <u>101</u> | <u>111</u> | 101 | 110 | 100 | 112 | <u>101</u> | <u>111</u> | 101 | 110 | 100 | 112 |
| 482.sphinx3 | 259 | 75.2 | 260 | 74.8 | <u>259</u> | <u>75.1</u> | 259 | 75.2 | 260 | 74.8 | <u>259</u> | <u>75.1</u> |

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 Option set to Disabled
Power Profile set to Custom
Power Regulator set to Static High Performance Mode
Minimum Processor Idle Power Core C-State set to C6-State
Minimum Processor Idle Power Package C-State set to No Package State
QPI Snoop Configuration set to Home Snoop
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 Double Refresh Rate set to 1x Refresh

Sysinfo program /cpu2006/config/sysinfo.rev6914
\$Rev: 6914 \$ \$Date:: 2014-06-25 # \$ e3fbb8667b5a285932ceab81e28219e1
running on ML350g9.localdomain Tue Apr 14 17:08:34 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 E5-2660 v3 @ 2.60GHz
 2 "physical id"s (chips)
 20 "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
cache size     : 25600 KB
```

```
From /proc/meminfo
MemTotal:      263846356 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 ML350g9.localdomain 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 Apr 14 17:05

SPEC is set to: /cpu2006
Filesystem Type Size Used Avail Use% Mounted on
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Platform Notes (Continued)

/dev/sda3 ext4 362G 15G 329G 5% /
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 P92 03/05/2015

Memory:

8x HP 752369-081 16 GB 2 rank 2133 MHz

8x UNKNOWN NOT AVAILABLE

8x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2133 MHz

(End of data from sysinfo program)

Regarding the sysinfo display about the memory installed, the correct amount of memory is 256 GB and the dmidecode description should have one line reading as:

8x HP 752369-081 16 GB 2 rank 2133 MHz

8x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2133 MHz

General Notes

Environment variables set by runspec before the start of the run:

KMP_AFFINITY = "granularity=fine,compact"

LD_LIBRARY_PATH = "/cpu2006/libs/32:/cpu2006/libs/64:/cpu2006/sh"

OMP_NUM_THREADS = "20"

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



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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 -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
```

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Peak Compiler Invocation (Continued)

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-

434.zeusmp: basepeak = yes

437.leslie3d: basepeak = yes

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Peak Optimization Flags (Continued)

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/HP-Platform-Flags-Intel-V1.2-HSW-revE.html>

<http://www.spec.org/cpu2006/flags/Intel-ic15.0-official-linux64.html>

You can also download the XML flags sources by saving the following links:

<http://www.spec.org/cpu2006/flags/HP-Platform-Flags-Intel-V1.2-HSW-revE.xml>

<http://www.spec.org/cpu2006/flags/Intel-ic15.0-official-linux64.xml>

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