



# SPEC® CFP2006 Result

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## Hewlett-Packard Company

SPECfp®\_rate2006 = 775

ProLiant BL460c Gen9  
(2.30 GHz, Intel Xeon E5-2670 v3)

SPECfp\_rate\_base2006 = 753

CPU2006 license: 3

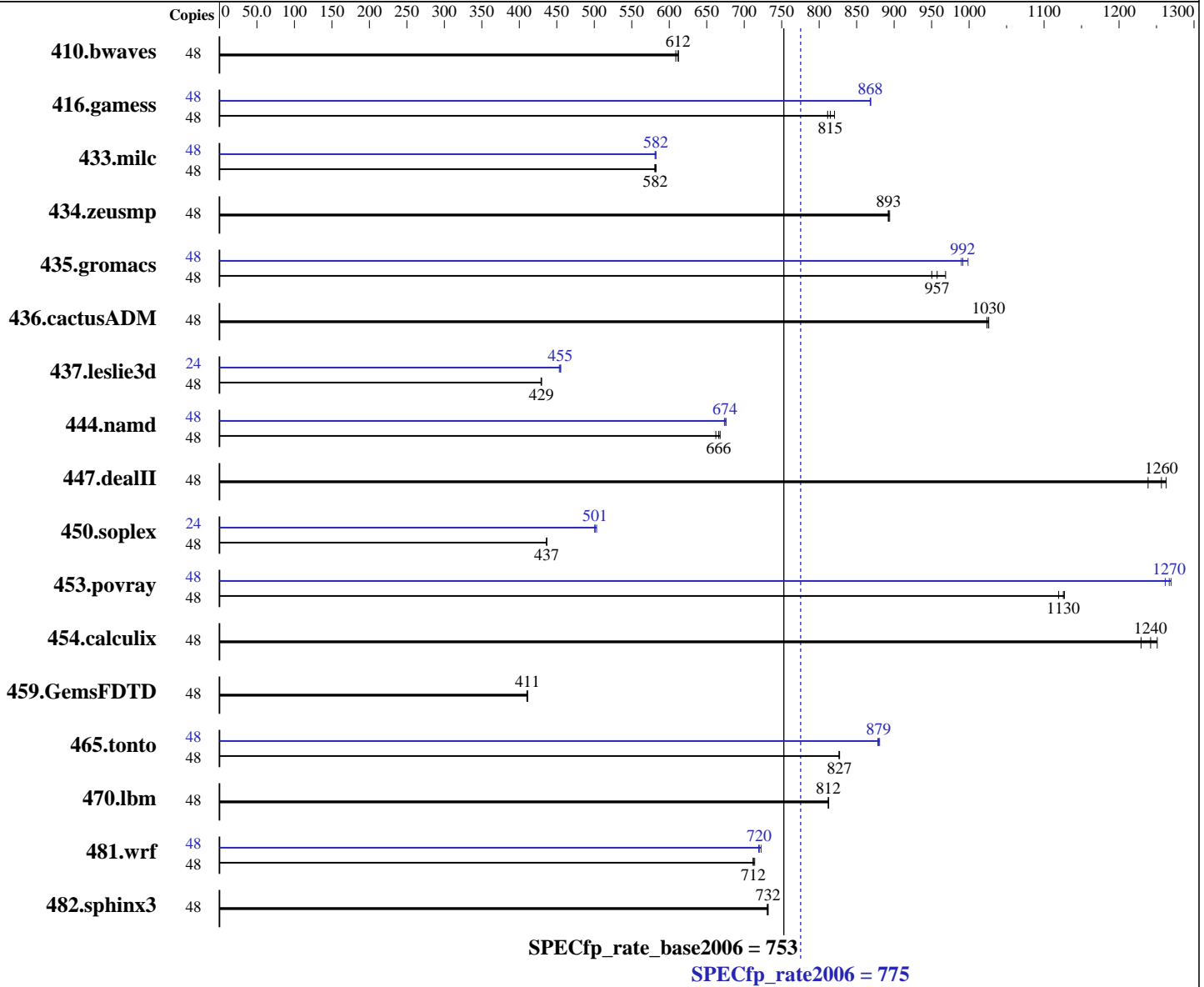
Test date: Nov-2014

Test sponsor: Hewlett-Packard Company

Hardware Availability: Sep-2014

Tested by: Hewlett-Packard Company

Software Availability: Sep-2014



### Hardware

CPU Name: Intel Xeon E5-2670 v3  
 CPU Characteristics: Intel Turbo Boost Technology up to 3.10 GHz  
 CPU MHz: 2300  
 FPU: Integrated  
 CPU(s) enabled: 24 cores, 2 chips, 12 cores/chip, 2 threads/core  
 CPU(s) orderable: 1,2 chips  
 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 7.0 (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: No  
 File System: xfs

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L3 Cache: 30 MB I+D on chip per chip  
Other Cache: None  
Memory: 256 GB (16 x 16 GB 2Rx4 PC4-2133P-R)  
Disk Subsystem: 2 x 300 GB 10 K SAS, RAID 1  
Other Hardware: None

System State: Run level 3 (multi-user)  
Base Pointers: 32/64-bit  
Peak Pointers: 32/64-bit  
Other Software: None

## Results Table

| Benchmark     | Base   |             |             |             |            |            |             | Peak   |             |             |             |            |            |             |
|---------------|--------|-------------|-------------|-------------|------------|------------|-------------|--------|-------------|-------------|-------------|------------|------------|-------------|
|               | Copies | Seconds     | Ratio       | Seconds     | Ratio      | Seconds    | Ratio       | Copies | Seconds     | Ratio       | Seconds     | Ratio      | Seconds    | Ratio       |
| 410.bwaves    | 48     | <b>1066</b> | <b>612</b>  | 1065        | 612        | 1072       | 609         | 48     | <b>1066</b> | <b>612</b>  | 1065        | 612        | 1072       | 609         |
| 416.gamess    | 48     | <b>1153</b> | <b>815</b>  | 1145        | 820        | 1158       | 811         | 48     | <b>1082</b> | <b>868</b>  | 1083        | 868        | 1082       | 869         |
| 433.milc      | 48     | <b>758</b>  | <b>582</b>  | 759         | 581        | 757        | 582         | 48     | 758         | 581         | <b>757</b>  | <b>582</b> | 757        | 582         |
| 434.zeusmp    | 48     | 489         | 894         | <b>489</b>  | <b>893</b> | 490        | 892         | 48     | 489         | 894         | <b>489</b>  | <b>893</b> | 490        | 892         |
| 435.gromacs   | 48     | 354         | 969         | <b>358</b>  | <b>957</b> | 361        | 950         | 48     | 346         | 990         | 343         | 999        | <b>346</b> | <b>992</b>  |
| 436.cactusADM | 48     | 560         | 1020        | 559         | 1030       | <b>559</b> | <b>1030</b> | 48     | 560         | 1020        | 559         | 1030       | <b>559</b> | <b>1030</b> |
| 437.leslie3d  | 48     | <b>1051</b> | <b>429</b>  | 1052        | 429        | 1050       | 430         | 24     | 496         | 455         | <b>496</b>  | <b>455</b> | 498        | 453         |
| 444.namd      | 48     | 576         | 668         | 581         | 662        | <b>578</b> | <b>666</b>  | 48     | 570         | 676         | <b>571</b>  | <b>674</b> | 572        | 674         |
| 447.dealII    | 48     | 443         | 1240        | 435         | 1260       | <b>437</b> | <b>1260</b> | 48     | 443         | 1240        | 435         | 1260       | <b>437</b> | <b>1260</b> |
| 450.soplex    | 48     | 917         | 436         | <b>917</b>  | <b>437</b> | 917        | 437         | 24     | 398         | 503         | 400         | 501        | <b>399</b> | <b>501</b>  |
| 453.povray    | 48     | 228         | 1120        | 227         | 1130       | <b>227</b> | <b>1130</b> | 48     | 201         | 1270        | 202         | 1260       | <b>202</b> | <b>1270</b> |
| 454.calculix  | 48     | <b>319</b>  | <b>1240</b> | 322         | 1230       | 317        | 1250        | 48     | <b>319</b>  | <b>1240</b> | 322         | 1230       | 317        | 1250        |
| 459.GemsFDTD  | 48     | 1242        | 410         | <b>1239</b> | <b>411</b> | 1239       | 411         | 48     | 1242        | 410         | <b>1239</b> | <b>411</b> | 1239       | 411         |
| 465.tonto     | 48     | 571         | 827         | 572         | 826        | <b>571</b> | <b>827</b>  | 48     | 538         | 878         | 536         | 881        | <b>537</b> | <b>879</b>  |
| 470.lbm       | 48     | <b>812</b>  | <b>812</b>  | 812         | 812        | 812        | 813         | 48     | <b>812</b>  | <b>812</b>  | 812         | 812        | 812        | 813         |
| 481.wrf       | 48     | <b>753</b>  | <b>712</b>  | 751         | 714        | 753        | 712         | 48     | <b>745</b>  | <b>720</b>  | 745         | 719        | 742        | 723         |
| 482.sphinx3   | 48     | 1278        | 732         | <b>1278</b> | <b>732</b> | 1280       | 731         | 48     | 1278        | 732         | <b>1278</b> | <b>732</b> | 1280       | 731         |

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 with:
echo always > /sys/kernel/mm/transparent_hugepage/enabled
Filesystem page cache cleared with:
echo 1> /proc/sys/vm/drop_caches
runspec command invoked through numactl i.e.:
numactl --interleave=all runspec <etc>
```



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**CPU2006 license:** 3  
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**Test date:** Nov-2014  
**Hardware Availability:** Sep-2014  
**Software Availability:** Sep-2014

### Platform Notes

#### BIOS Configuration:

HP Power Profile set to Maximum Performance  
QPI Snoop Configuration set to Cluster on Die  
Thermal Configuration set so Maximum Cooling  
Processor Power and Utilization Monitoring set to Disabled  
Memory Refresh Rate set to 1x Refresh

Sysinfo program /home/cpu/config/sysinfo.rev6914  
\$Rev: 6914 \$ \$Date:: 2014-06-25 #\$ e3fbb8667b5a285932ceab81e28219e1  
running on localhost.localdomain Tue Nov 25 08:51:24 2014

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 E5-2670 v3 @ 2.30GHz
 2 "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     : 6
  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
cache size      : 15360 KB
```

```
From /proc/meminfo
MemTotal:        263847884 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 localhost.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 Nov 24 18:44

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### Platform Notes (Continued)

SPEC is set to: /home/cpu

| Filesystem                | Type | Size | Used | Avail | Use% | Mounted on |
|---------------------------|------|------|------|-------|------|------------|
| /dev/mapper/rhel-home xfs |      | 225G | 116G | 110G  | 52%  | /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 I36 07/11/2014

Memory:

16x HP 752369-081 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:

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

### General Notes

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

LD\_LIBRARY\_PATH = "/home/cpu/libs/32:/home/cpu/libs/64:/home/cpu/sh"

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

416.gamess: -DSPEC\_CPU\_LP64

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## Base Portability Flags (Continued)

```

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 -opt-prefetch -auto-p32
-ansi-alias

```

C++ benchmarks:

```

-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32
-ansi-alias

```

Fortran benchmarks:

```

-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch

```

Benchmarks using both Fortran and C:

```

-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32
-ansi-alias

```

## Peak Compiler Invocation

C benchmarks:

```

icc -m64

```

C++ benchmarks (except as noted below):

```

icpc -m64

```

```

450.soplex: icpc -m32 -L/opt/intel/composer_xe_2015/lib/ia32

```

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

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  
 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

## 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

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: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)  
-O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2)  
-opt-malloc-options=3

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## Peak Optimization Flags (Continued)

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: -xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch

459.GemsFDTD: basepeak = yes

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) -unroll4  
-auto -inline-calloc -opt-malloc-options=3

Benchmarks using both Fortran and C:

435.gromacs: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)  
-O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2)  
-opt-prefetch -auto-ilp32

436.cactusADM: basepeak = yes

454.calculix: basepeak = yes

481.wrf: -xCORE-AVX2 -ipo -O3 -no-prec-div -auto-ilp32

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>

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For other inquiries, please contact [webmaster@spec.org](mailto:webmaster@spec.org).

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