



# SPEC® CFP2006 Result

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## Hewlett-Packard Company

SPECfp®\_rate2006 = 500

ProLiant BL420c Gen8  
(2.40 GHz, Intel Xeon E5-2470 v2)

SPECfp\_rate\_base2006 = 487

CPU2006 license: 3

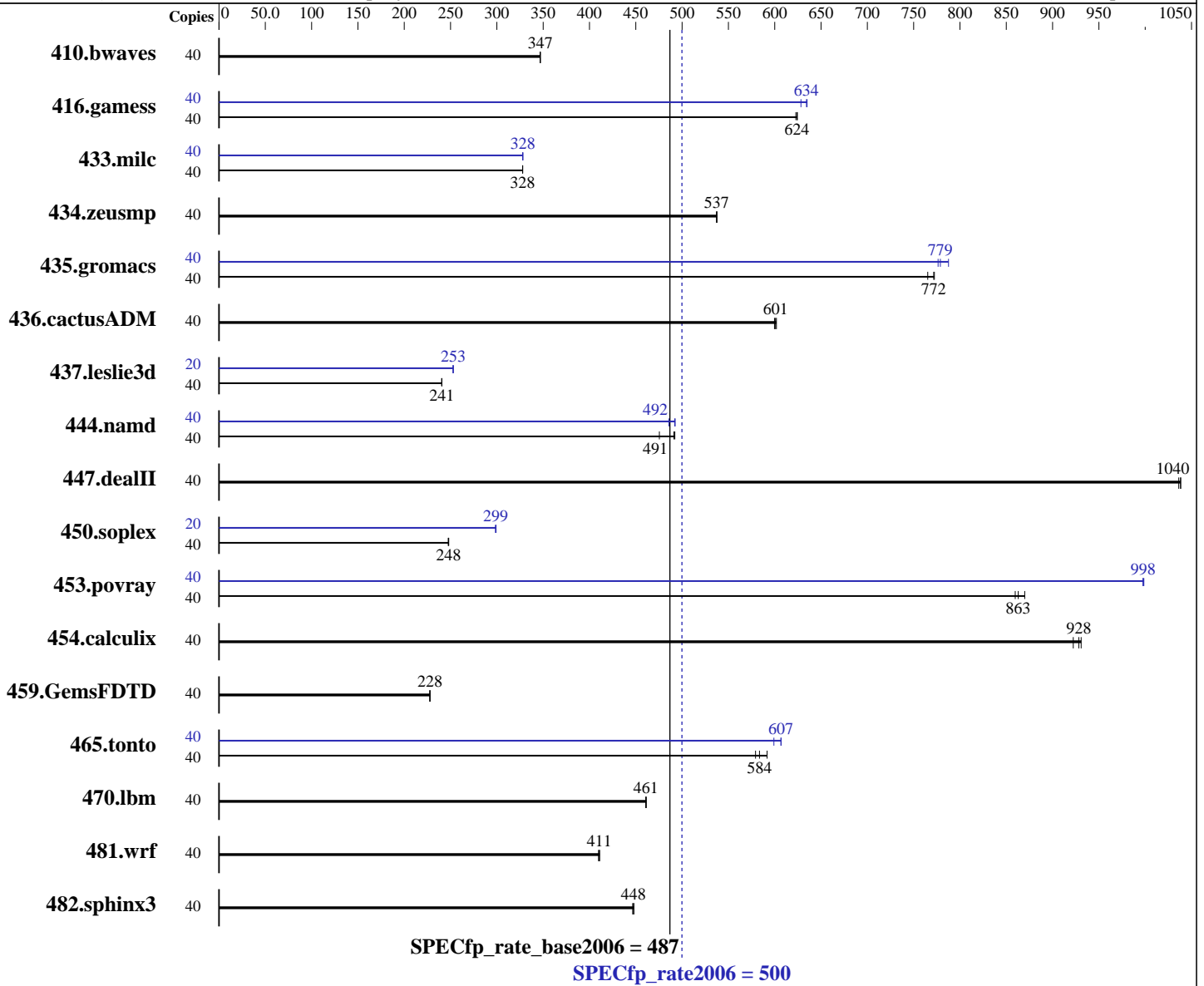
Test date: Dec-2013

Test sponsor: Hewlett-Packard Company

Hardware Availability: Jan-2014

Tested by: Hewlett-Packard Company

Software Availability: Sep-2013



### Hardware

CPU Name: Intel Xeon E5-2470 v2  
 CPU Characteristics: Intel Turbo Boost Technology up to 3.20 GHz  
 CPU MHz: 2400  
 FPU: Integrated  
 CPU(s) enabled: 20 cores, 2 chips, 10 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 6.4, (Santiago)  
 Kernel 2.6.32-358.el6.x86\_64  
 Compiler: C/C++: Version 14.0.0.080 of Intel C++ Studio XE for Linux;  
 Fortran: Version 14.0.0.080 of Intel Fortran Studio XE for Linux  
 Auto Parallel: No  
 File System: ext4

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L3 Cache: 25 MB I+D on chip per chip  
Other Cache: None  
Memory: 96 GB (12 x 8 GB 2Rx4 PC3-12800R-11, ECC)  
Disk Subsystem: 2 x 300 GB 15 K SAS, RAID 0  
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	40	1567	347	<b><u>1567</u></b>	<b><u>347</u></b>	1567	347	40	1567	347	<b><u>1567</u></b>	<b><u>347</u></b>	1567	347
416.gamess	40	1254	624	<b><u>1255</u></b>	<b><u>624</u></b>	1258	623	40	1233	635	1247	628	<b><u>1235</u></b>	<b><u>634</u></b>
433.milc	40	<b><u>1120</u></b>	<b><u>328</u></b>	1120	328	1120	328	40	1119	328	<b><u>1120</u></b>	<b><u>328</u></b>	1120	328
434.zeusmp	40	678	537	677	538	<b><u>677</u></b>	<b><u>537</u></b>	40	678	537	677	538	<b><u>677</u></b>	<b><u>537</u></b>
435.gromacs	40	370	772	<b><u>370</u></b>	<b><u>772</u></b>	373	765	40	<b><u>367</u></b>	<b><u>779</u></b>	363	788	368	776
436.cactusADM	40	<b><u>796</u></b>	<b><u>601</u></b>	794	602	797	600	40	<b><u>796</u></b>	<b><u>601</u></b>	794	602	797	600
437.leslie3d	40	<b><u>1563</u></b>	<b><u>241</u></b>	1562	241	1564	240	20	<b><u>743</u></b>	<b><u>253</u></b>	744	253	743	253
444.namd	40	<b><u>653</u></b>	<b><u>491</u></b>	652	492	675	475	40	660	486	<b><u>652</u></b>	<b><u>492</u></b>	651	493
447.dealII	40	<b><u>441</u></b>	<b><u>1040</u></b>	442	1040	441	1040	40	<b><u>441</u></b>	<b><u>1040</u></b>	442	1040	441	1040
450.soplex	40	1348	248	1345	248	<b><u>1346</u></b>	<b><u>248</u></b>	20	559	299	558	299	<b><u>559</u></b>	<b><u>299</u></b>
453.povray	40	245	870	248	860	<b><u>247</u></b>	<b><u>863</u></b>	40	213	999	<b><u>213</u></b>	<b><u>998</u></b>	213	998
454.calculix	40	<b><u>355</u></b>	<b><u>928</u></b>	355	931	358	922	40	<b><u>355</u></b>	<b><u>928</u></b>	355	931	358	922
459.GemsFDTD	40	1864	228	1863	228	<b><u>1864</u></b>	<b><u>228</u></b>	40	1864	228	1863	228	<b><u>1864</u></b>	<b><u>228</u></b>
465.tonto	40	679	579	<b><u>675</u></b>	<b><u>584</u></b>	665	592	40	657	599	<b><u>649</u></b>	<b><u>607</u></b>	649	607
470.lbm	40	1193	461	1191	461	<b><u>1192</u></b>	<b><u>461</u></b>	40	1193	461	1191	461	<b><u>1192</u></b>	<b><u>461</u></b>
481.wrf	40	1091	410	<b><u>1088</u></b>	<b><u>411</u></b>	1087	411	40	1091	410	<b><u>1088</u></b>	<b><u>411</u></b>	1087	411
482.sphinx3	40	1746	447	<b><u>1742</u></b>	<b><u>448</u></b>	1740	448	40	1746	447	<b><u>1742</u></b>	<b><u>448</u></b>	1740	448

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/redhat\_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>  
Disabled unused Linux services through "stop\_services.sh" before running.



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**Test date:** Dec-2013  
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**Software Availability:** Sep-2013

### Platform Notes

#### BIOS Configuration:

HP Power Profile set to Maximum Performance  
Memory Power Savings Mode set to Maximum Performance  
Collaborative Power Control set to Disabled  
Dynamic Power Capping Functionality set to Disabled  
Thermal Configuration set to Maximum Cooling  
Processor Power and Utilization Monitoring set to Disabled  
Memory Refresh Rate set to 1x

Sysinfo program /cpu2006/config/sysinfo.rev6818  
\$Rev: 6818 \$ \$Date: 2012-07-17 # \$ e86d102572650a6e4d596a3cee98f191  
running on BL420c-Gen8 Tue Dec 3 04:34:25 2013

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 E5-2470 v2 @ 2.40GHz
 2 "physical id"s (chips)
 40 "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  : 20
  physical 0: cores 0 1 2 3 4 8 9 10 11 12
  physical 1: cores 0 1 2 3 4 8 9 10 11 12
cache size : 25600 KB
```

#### From /proc/meminfo

```
MemTotal: 99163924 kB
HugePages_Total: 0
Hugepagesize: 2048 kB
```

#### /usr/bin/lsb\_release -d

```
Red Hat Enterprise Linux Server release 6.4 (Santiago)
```

#### From /etc/\*release\* /etc/\*version\*

```
redhat-release: Red Hat Enterprise Linux Server release 6.4 (Santiago)
system-release: Red Hat Enterprise Linux Server release 6.4 (Santiago)
system-release-cpe: cpe:/o:redhat:enterprise_linux:6server:ga:server
```

#### uname -a:

```
Linux BL420c-Gen8 2.6.32-358.el6.x86_64 #1 SMP Tue Jan 29 11:47:41 EST 2013
x86_64 x86_64 x86_64 GNU/Linux
```

#### run-level 3 Dec 2 15:40

#### SPEC is set to: /cpu2006

```
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda3 ext4 273G 24G 236G 10% /
Continued on next page
```



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## Platform Notes (Continued)

Additional information from dmidecode:  
BIOS HP I30 01/20/2014  
Memory:  
12x HP 689911-071 8 GB 1600 MHz 2 rank  
  
(End of data from sysinfo program)

## General Notes

Environment variables set by runspec before the start of the run:  
LD\_LIBRARY\_PATH = "/cpu2006/libs/32:/cpu2006/libs/64:/cpu2006/sh"  
  
Binaries compiled on a system with 1x Core i7-860 CPU + 8GB  
memory using RedHat EL 6.4

## 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  
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

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## Base Portability Flags (Continued)

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:

-xAVX -ipo -O3 -no-prec-div -opt-prefetch -auto-p32 -ansi-alias  
-opt-mem-layout-trans=3

C++ benchmarks:

-xAVX -ipo -O3 -no-prec-div -opt-prefetch -auto-p32 -ansi-alias  
-opt-mem-layout-trans=3

Fortran benchmarks:

-xAVX -ipo -O3 -no-prec-div -opt-prefetch

Benchmarks using both Fortran and C:

-xAVX -ipo -O3 -no-prec-div -opt-prefetch -auto-p32 -ansi-alias  
-opt-mem-layout-trans=3

## Peak Compiler Invocation

C benchmarks:

icc -m64

C++ benchmarks (except as noted below):

icpc -m64

450.soplex: icpc -m32

Fortran benchmarks:

ifort -m64

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

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## Peak Portability Flags (Continued)

```
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: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -opt-mem-layout-trans=3(pass 2)
-prof-use(pass 2) -auto-ilp32
```

470.lbm: basepeak = yes

482.sphinx3: basepeak = yes

C++ benchmarks:

```
444.namd: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -opt-mem-layout-trans=3(pass 2)
-prof-use(pass 2) -fno-alias -auto-ilp32
```

447.dealII: basepeak = yes

```
450.soplex: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -opt-mem-layout-trans=3(pass 2)
-prof-use(pass 2) -opt-malloc-options=3
```

```
453.povray: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -opt-mem-layout-trans=3(pass 2)
-prof-use(pass 2) -unroll4 -ansi-alias
```

Fortran benchmarks:

410.bwaves: basepeak = yes

```
416.gamess: -xAVX(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: -xAVX -ipo -O3 -no-prec-div -opt-prefetch

459.GemsFDTD: basepeak = yes

465.tonto: -xAVX(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: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(pass 2) -opt-mem-layout-trans=3(pass 2)  
-prof-use(pass 2) -opt-prefetch -auto-ilp32

436.cactusADM: basepeak = yes

454.calculix: basepeak = yes

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-revB.html>  
<http://www.spec.org/cpu2006/flags/Intel-ic14.0-official-linux64.20140128.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-revB.xml>  
<http://www.spec.org/cpu2006/flags/Intel-ic14.0-official-linux64.20140128.xml>

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

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