Hewlett-Packard Company

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

SPECfp®2006 = 79.3
SPECfp_base2006 = 76.5

CPU2006 license: 3
Test sponsor: Hewlett-Packard Company
Tested by: Hewlett-Packard Company

Test date: Dec-2013
Hardware Availability: Jan-2014
Software Availability: Sep-2013

410.bwaves
416.gamess
433.milc
434.zeusmp
435.gromacs
436.cactusADM
437.leslie3d
444.namd
447.dealII
450.soplex
453.povray
454.calculix
459.GemsFDTD
465.tonto
470.lbm
481.wrf
482.sphinx3

SPECfp_base2006 = 76.5
SPECfp2006 = 79.3

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: 10 cores, 1 chip, 10 cores/chip
CPU(s) orderable: 1 chip
Primary Cache: 32 KB I + 32 KB D on chip per core
Secondary Cache: 256 KB I+D on chip per core

Software
Operating System: SUSE Linux Enterprise Server 11 (x86_64) SP3
Kernel 3.0.76-0.11-default
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: Yes
File System: ext3
System State: Run level 3 (multi-user)
**Hewlett-Packard Company**

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

**CPU2006 license:** 3  
**Test sponsor:** Hewlett-Packard Company  
**Tested by:** Hewlett-Packard Company  
**L3 Cache:** 25 MB I+D on chip per chip  
**Other Cache:** None  
**Memory:** 48 GB (6 x 8 GB 2Rx4 PC3-12800R-11, ECC)  
**Disk Subsystem:** 2 x 300 GB 15 K SAS, RAID 0  
**Other Hardware:** None

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

## Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Base Seconds</th>
<th>Base Ratio</th>
<th>Base Seconds</th>
<th>Base Ratio</th>
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<td>71.3</td>
<td>273</td>
<td>71.4</td>
<td>273</td>
<td>71.3</td>
</tr>
</tbody>
</table>

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/redhat_transparent_hugepage/enabled  
Filesystem page cache cleared with:  
echo 1 > /proc/sys/vm/drop_caches  
Disabled unused Linux/services through "stop_services.sh" before running.

### Platform Notes

**BIOS Configuration:**  
HP Power Profile set to Maximum Performance  
Intel Hyperthreading Options set to Disabled  
Memory Power Savings Mode set to Maximum Performance  
Collaborative Power Control set to Disabled

Continued on next page
Hewlett-Packard Company
ProLiant BL420c Gen8
(2.40 GHz, Intel Xeon E5-2470 v2)

SPEC CFP2006 Result

SPECfp2006 = 79.3
SPECfp_base2006 = 76.5

CPU2006 license: 3
Test sponsor: Hewlett-Packard Company
Tested by: Hewlett-Packard Company

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
Minimum Processor Idle Power Core State set to C6 State
Minimum Processor Idle Power Packages State set to Package C6 (non-retention) State

Platform Notes (Continued)

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
 1 "physical id"s (chips)
 10 "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 1 2 3 4 8 9 10 11 12
cache size : 25600 KB

From /proc/meminfo
MemTotal: 49391292 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

/usr/bin/lsb_release -d
SUSE Linux Enterprise Server 11 (x86_64)

From /etc/*release* /etc/*version*
SuSE-release:
  SUSE Linux Enterprise Server 11 (x86_64)
  VERSION = 11
  PATCHLEVEL = 3

uname -a:
  Linux BL420c-Gen8-new 3.0.76-0.11-default #1 SMP Fri Jun 14 08:21:43 UTC 2013
  (ccab990) x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Dec 10 17:31 last=S

SPEC is set to: /cpu2006
  Filesystem   Type  Size  Used Avail Use% Mounted on
/dev/sda3     ext3  273G  15G  245G  6% /

Additional information from dmidecode:
Continued on next page
Hewlett-Packard Company
ProLiant BL420c Gen8
(2.40 GHz, Intel Xeon E5-2470 v2)

| SPECfp2006  | 79.3 |
| SPECfp_base2006 | 76.5 |

CPU2006 license: 3
Test sponsor: Hewlett-Packard Company
Tested by: Hewlett-Packard Company

**Platform Notes (Continued)**

- BIOS HP I30 01/20/2014
- Memory:
  - 6x HP 689911-071 8 GB 1600 MHz
  - 6x UNKNOWN NOT AVAILABLE

(End of data from sysinfo program)

Regarding the sysinfo display about the memory installed, the correct amount of memory is 48 GB and the dmidecode description should have one line reading as:
- 6x HP 689911-071 8 GB 1600 MHz

**General Notes**

- Environment variables set by runspec before the start of the run:
  - KMP_AFFINITY = "granularity=fine,compact,1,0"
  - LD_LIBRARY_PATH = "/cpu2006/libs/32:/cpu2006/libs/64:/cpu2006/sh"
  - OMP_NUM_THREADS = "10"

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 -nofor_main
- 436.cactusADM: -DSPEC_CPU_LP64 -nofor_main
- 437.leslie3d: -DSPEC_CPU_LP64
- 444.namd: -DSPEC_CPU_LP64
- 447.dealII: -DSPEC_CPU_LP64
**Hewlett-Packard Company**

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

<table>
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<tr>
<th>Metric</th>
<th>Value</th>
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<td>SPECfp_base2006</td>
<td>76.5</td>
</tr>
</tbody>
</table>

**CPU2006 license:** 3  
**Test sponsor:** Hewlett-Packard Company  
**Tested by:** Hewlett-Packard Company

### Base Portability Flags (Continued)

- 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:**

```bash
-xAVX  -ipo  -O3  -no-prec-div  -parallel  -opt-prefetch  -ansi-alias
```

**C++ benchmarks:**

```bash
-xAVX  -ipo  -O3  -no-prec-div  -opt-prefetch  -ansi-alias
```

**Fortran benchmarks:**

```bash
-xAVX  -ipo  -O3  -no-prec-div  -parallel  -opt-prefetch
```

**Benchmarks using both Fortran and C:**

```bash
-xAVX  -ipo  -O3  -no-prec-div  -parallel  -opt-prefetch  -ansi-alias
```

### Peak Compiler Invocation

**C benchmarks:**

```bash
icc  -m64
```

**C++ benchmarks:**

```bash
icpc  -m64
```

**Fortran benchmarks:**

```bash
ifort  -m64
```

**Benchmarks using both Fortran and C:**

```bash
icc  -m64  ifort  -m64
```

### Peak Portability Flags

Same as Base Portability Flags
**SPEC CFP2006 Result**

**Hewlett-Packard Company**
ProLiant BL420c Gen8
(2.40 GHz, Intel Xeon E5-2470 v2)

| SPECfp2006 | 79.3 |
| SPECfp_base2006 | 76.5 |

**CPU2006 license:** 3  
**Test sponsor:** Hewlett-Packard Company  
**Tested by:** Hewlett-Packard Company  

**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) -prof-use(pass 2) -auto-ilp32  
  -ansi-alias  

- 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) -prof-use(pass 2) -fno-alias  
  -auto-ilp32

- 447.dealII: basepeak = yes

- 450.soplex: basepeak = yes

- 453.povray: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)  
  -no-prec-div(pass 2) -prof-use(pass 2) -unroll14 -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-

- 434.zeusmp: basepeak = yes

- 437.leslie3d: basepeak = yes

- 459.GemsFDTD: -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 -opt-prefetch -parallel

- 465.tonto: -xAVX(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

Continued on next page
Hewlett-Packard Company
ProLiant BL420c Gen8
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SPECfp2006 = 79.3
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CPU2006 license: 3
Test sponsor: Hewlett-Packard Company
Tested by: Hewlett-Packard Company

Test date: Dec-2013
Hardware Availability: Jan-2014
Software Availability: Sep-2013

Peak Optimization Flags (Continued)
454.calculix: -xAVX -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-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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