**Hewlett-Packard Company**  
ProLiant BL460c Gen9  
(2.30 GHz, Intel Xeon E5-2698 v3)

**CPU2006 license:** 3  
**Test sponsor:** Hewlett-Packard Company  
**Tested by:** Hewlett-Packard Company  
**Test date:** Sep-2014  
**Hardware Availability:** Sep-2014  
**Software Availability:** Jun-2014

### Hardware

<table>
<thead>
<tr>
<th>Component</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name</td>
<td>Intel Xeon E5-2698 v3</td>
</tr>
<tr>
<td>CPU Characteristics</td>
<td>Intel Turbo Boost Technology up to 3.60 GHz</td>
</tr>
<tr>
<td>CPU MHz</td>
<td>2300</td>
</tr>
<tr>
<td>FPU</td>
<td>Integrated</td>
</tr>
<tr>
<td>CPU(s) enabled</td>
<td>32 cores, 2 chips, 16 cores/chip, 2 threads/core</td>
</tr>
<tr>
<td>CPU(s) orderable</td>
<td>1.2 chip</td>
</tr>
<tr>
<td>Primary Cache</td>
<td>32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td>Secondary Cache</td>
<td>256 KB I+D on chip per core</td>
</tr>
<tr>
<td>L3 Cache</td>
<td>40 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other Cache</td>
<td>None</td>
</tr>
<tr>
<td>Memory</td>
<td>256 GB (16 x 16 GB 2Rx4 PC4-2133P-R)</td>
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<tr>
<td>Disk Subsystem</td>
<td>2 x 400 GB SAS SSD, RAID 1</td>
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<tr>
<td>Other Hardware</td>
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</table>

### Software

<table>
<thead>
<tr>
<th>Component</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating System</td>
<td>Red Hat Enterprise Linux Server release 7.0</td>
</tr>
<tr>
<td></td>
<td>(Maipo)</td>
</tr>
<tr>
<td></td>
<td>Kernel 3.10.0-123.el7.x86_64</td>
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<tr>
<td>Compiler</td>
<td>C/C++: Version 14.0.0.0.080 of Intel C++ Studio XE</td>
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<tr>
<td></td>
<td>for Linux</td>
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<tr>
<td>Auto Parallel</td>
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<tr>
<td>File System</td>
<td>ext4</td>
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<tr>
<td>System State</td>
<td>Run level 3 (multi-user)</td>
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<tr>
<td>Base Pointers</td>
<td>32-bit</td>
</tr>
<tr>
<td>Peak Pointers</td>
<td>32/64-bit</td>
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<tr>
<td>Other Software</td>
<td>Microquill SmartHeap V10.0</td>
</tr>
</tbody>
</table>
### Spec Int Rate 2006 Result

**Hewlett-Packard Company**

ProLiant BL460c Gen9
(2.30 GHz, Intel Xeon E5-2698 v3)

**SPECint_rate2006 = 1250**

**SPECint_rate_base2006 = 1210**

---

**Results Table**

<table>
<thead>
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<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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</thead>
<tbody>
<tr>
<td>400.perlbench</td>
<td>64</td>
<td>642</td>
<td>974</td>
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<td>976</td>
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<td>1190</td>
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<td>1190</td>
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<td>401.bzip2</td>
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<td>635</td>
<td>64</td>
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<td>988</td>
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<td>473.astar</td>
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<td>663</td>
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<tr>
<td>483.xalancbmk</td>
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<td>360</td>
<td>1230</td>
<td>64</td>
<td>360</td>
<td>1230</td>
<td>359</td>
<td>1230</td>
<td>360</td>
<td>1230</td>
</tr>
</tbody>
</table>

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>

### Platform Notes

BIOS Configuration:
- HP Power Profile set to Custom
- HP Power Regulator set to HP Static High Performance Mode
- Minimum Processor Idle Power Package C-State set to No Package State
- QPI Snoop Configuration set to Cluster on Die
- Thermal Configuration set to Maximum Cooling
- Processor Power and Utilization Monitoring set to Disabled
- Memory Refresh Rate set to 1x Refresh

Sysinfo program /cpu2006/config/sysinfo.rev6818
$Rev: 6818 $ $Date:: 2012-07-17 #$ e86d102572650a6e4d596a3cee98f191

Continued on next page
Platform Notes (Continued)
running on BL460cGen9-VP2 Wed Sep 10 13:16:02 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 E5-2698 v3 @ 2.30GHz
  2 "physical id"s (chips)
  64 "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 : 8
    siblings  : 16
    physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
    physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
  cache size : 20480 KB

From /proc/meminfo
  MemTotal:       263840152 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 BL460cGen9-VP2 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 Sep 10 13:14

SPEC is set to: /cpu2006
  Filesystem Type Size Used Avail Use% Mounted on
  /dev/mapper/rhel-root ext4 310G 12G 283G 4% /

Additional information from dmidecode:
  BIOS HP I36 07/11/2014
  Memory:
    16x HP NOT AVAILABLE 16 GB 2133 MHz 2 rank
Continued on next page
SPEC CINT2006 Result

Hewlett-Packard Company

ProLiant BL460c Gen9
(2.30 GHz, Intel Xeon E5-2698 v3)

| SPECint_rate2006 = | 1250 |
| SPECint_rate_base2006 = | 1210 |

CPU2006 license: 3  
Test sponsor: Hewlett-Packard Company  
Tested by: Hewlett-Packard Company  
Test date: Sep-2014  
Hardware Availability: Sep-2014  
Software Availability: Jun-2014

Platform Notes (Continued)

(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 -m32

C++ benchmarks:
icpc -m32

Base Portability Flags

400.perlbench: -DSPEC_CPU_LINUX_IA32
462.libquantum: -DSPEC_CPU_LINUX
483.xalancbmk: -DSPEC_CPU_LINUX

Base Optimization Flags

C benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch
-opt-mem-layout-trans=3

C++ benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch
-opt-mem-layout-trans=3 -Wl,-z,muldefs -L/sh -lsmartheap

Base Other Flags

C benchmarks:
403.gcc: -Dalloca=_alloca
Hewlett-Packard Company
ProLiant BL460c Gen9
(2.30 GHz, Intel Xeon E5-2698 v3)

SPECint_rate2006 = 1250
SPECint_rate_base2006 = 1210

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

Peak Compiler Invocation

C benchmarks (except as noted below):
  icc -m32
  400.perlbench: icc -m64
  401.bzip2: icc -m64
  456.hmmer: icc -m64
  458.sjeng: icc -m64

C++ benchmarks:
  icpc -m32

Peak Portability Flags

  400.perlbench: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX_X64
  401.bzip2: -DSPEC_CPU_LP64
  456.hmmer: -DSPEC_CPU_LP64
  458.sjeng: -DSPEC_CPU_LP64
  462.libquantum: -DSPEC_CPU_LINUX
  483.xalancbmk: -DSPEC_CPU_LINUX

Peak Optimization Flags

C benchmarks:
  400.perlbench: -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
  401.bzip2: -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 -ansi-alias
  403.gcc(basepeak = yes
  429.mcf: basepeak = yes
  445.gobmk: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -prof-use(pass 2)
  -ansi-alias -opt-mem-layout-trans=3
  456.hmmer: -xCORE-AVX2 -ipo -O3 -no-prec-div -unroll2 -auto-ilp32
  458.sjeng: -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-ilp32

Continued on next page
Hewlett-Packard Company

ProLiant BL460c Gen9
(2.30 GHz, Intel Xeon E5-2698 v3)

| SPECint_rate2006 | 1250 |
| SPECint_rate_base2006 | 1210 |

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

Peak Optimization Flags (Continued)

462.libquantum: basepeak = yes
464.h264ref:
-xCORE-AVX2 (pass 2) -prof-gen (pass 1) -ipo (pass 2)
-O3 (pass 2) -no-prec-div (pass 2) -prof-use (pass 2)
-unroll2 -ansi-alias

C++ benchmarks:
471.omnetpp:
-xCORE-AVX2 (pass 2) -prof-gen (pass 1) -ipo (pass 2)
-O3 (pass 2) -prof-use (pass 2)
-ansi-alias 
-opt-ra-region-strategy=block -Wl,-z,muldefs
-L/sh -lsmartheap
473.astar: basepeak = yes
483.xalancbmk: basepeak = yes

Peak Other Flags

C benchmarks:
403.gcc:
-Dalloca=_alloca

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2006/flags/Intel-ic14.0-official-linux64.20140128.html
http://www.spec.org/cpu2006/flags/HP-Platform-Flags-Intel-V1.2-HSW-revB.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/Intel-ic14.0-official-linux64.20140128.xml
http://www.spec.org/cpu2006/flags/HP-Platform-Flags-Intel-V1.2-HSW-revB.xml

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For other inquiries, please contact webmaster@spec.org.

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