Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant XL450 Gen9
(2.10 GHz, Intel Xeon E5-2695 v4)

CPU2006 license: 3
Test sponsor: HPE
Tested by: HPE

SPECint\_rate2006 = 1440
SPECint\_rate_base2006 = 1380

Test date: May-2016
Hardware Availability: Mar-2016

Software

Operating System: Red Hat Enterprise Linux Server release 7.2, (Maipo)
Compiler: C/C++: Version 16.0.0.101 of Intel C++ Studio XE for Linux
Auto Parallel: No
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 32-bit
Peak Pointers: 32/64-bit
Other Software: Microquill SmartHeap V10.2

<table>
<thead>
<tr>
<th>Software</th>
<th>Hardware</th>
</tr>
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<tbody>
<tr>
<td>Operating System: Red Hat Enterprise Linux Server release 7.2, (Maipo)</td>
<td>CPU Name: Intel Xeon E5-2695 v4</td>
</tr>
<tr>
<td>Compiler: C/C++: Version 16.0.0.101 of Intel C++ Studio XE for Linux</td>
<td>CPU Characteristics: Intel Turbo Boost Technology up to 3.30 GHz</td>
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<tr>
<td>Auto Parallel: No</td>
<td>CPU MHz: 2100</td>
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<tr>
<td>File System: xfs</td>
<td>FPU: Integrated</td>
</tr>
<tr>
<td>System State: Run level 3 (multi-user)</td>
<td>CPU(s) enabled: 36 cores, 2 chips, 18 cores/chip, 2 threads/core</td>
</tr>
<tr>
<td>Base Pointers: 32-bit</td>
<td>CPU(s) orderable: 1.2 chips</td>
</tr>
<tr>
<td>Peak Pointers: 32/64-bit</td>
<td>Primary Cache: 32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td>Other Software: Microquill SmartHeap V10.2</td>
<td>Secondary Cache: 256 KB I+D on chip per core</td>
</tr>
</tbody>
</table>

| L3 Cache: 45 MB I+D on chip per chip |
| Other Cache: None |
| Memory: 256 GB (8 x 32 GB 2Rx4 PC4-2400T-R) |
| Disk Subsystem: 2 x 480 GB SATA SSD, RAID 1 |
| Other Hardware: None |
Hewlett Packard Enterprise
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ProLiant XL450 Gen9
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SPEC CINT2006 Result

CPU2006 license: 3
Test sponsor: HPE
Tested by: HPE

SPECint_rate2006 = 1440
SPECint_rate_base2006 = 1380

Results Table

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<td>473.astar</td>
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<td>647</td>
<td>782</td>
<td>644</td>
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<td>483.xalancbmk</td>
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<td>1470</td>
<td>336</td>
<td>1480</td>
<td>336</td>
<td>1480</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

Platform Notes
BIOS Configuration:
  Power Profile set to Maximum Performance
  QPI Snoop Configuration set to Cluster on Die
  Collaborative Power Control set to Disabled
  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 No1-xl450-g9 Fri May 20 01:06:24 2016

This section contains SUT (System Under Test) info as seen by
Continued on next page
SPEC CINT2006 Result

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Software Availability: Nov-2015

Platform Notes (Continued)

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 E5-2695 v4 @ 2.10GHz
 2 "physical id"s (chips)
 72 "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 : 18
siblings : 36
physical 0: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
physical 1: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
cache size : 23040 KB

From /proc/meminfo
MemTotal: 263705204 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
oorelease:
NAME="Red Hat Enterprise Linux Server"
VERSION="7.2 (Maipo)"
ID="rhel"
ID_LIKE="fedora"
VERSION_ID="7.2"
PRETTY_NAME="Red Hat Enterprise Linux Server 7.2 (Maipo)"
ANSI_COLOR="0;31"
CPE_NAME="cpe:/o:redhat:enterprise_linux:7.2:GA:server"
redhat-release: Red Hat Enterprise Linux Server release 7.2 (Maipo)
system-release: Red Hat Enterprise Linux Server release 7.2 (Maipo)

uname -a:
Linux No1-xl450-g9 3.10.0-327.e17.x86_64 #1 SMP Thu Oct 29 17:29:29 EDT 2015
x86_64 x86_64 x86_64 GNU/Linux

run-level 3 May 18 23:57

SPEC is set to: /cpu2006
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda4 xfs 439G 20G 419G 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 U21 03/10/2016

Continued on next page
Hewlett Packard Enterprise  
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<td>Hardware Availability: Mar-2016</td>
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<tr>
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<td>Software Availability: Nov-2015</td>
</tr>
</tbody>
</table>

### Platform Notes (Continued)

Memory:
8x UNKNOWN NOT AVAILABLE
8x UNKNOWN NOT AVAILABLE 32 GB 2 rank 2400 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 UNKNOWN NOT AVAILABLE 32 GB 2 rank 2400 MHz

### 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 Intel Core i5-4670K CPU + 32GB memory using RedHat EL 7.1

### Base Compiler Invocation

**C benchmarks:**

```
icc -m32 -L/opt/intel/compilers_and_libraries_2016/linux/compiler/lib/ia32_lin
```

**C++ benchmarks:**

```
icpc -m32 -L/opt/intel/compilers_and_libraries_2016/linux/compiler/lib/ia32_lin
```

### Base Portability Flags

400.perlbench: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LINUX_IA32
401.bzip2: -D_FILE_OFFSET_BITS=64
403.gcc: -D_FILE_OFFSET_BITS=64
429.mcf: -D_FILE_OFFSET_BITS=64
445.gobmk: -D_FILE_OFFSET_BITS=64
456.hmmer: -D_FILE_OFFSET_BITS=64
458.sjeng: -D_FILE_OFFSET_BITS=64
462.libquantum: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LINUX
464.h264ref: -D_FILE_OFFSET_BITS=64
471.omnetpp: -D_FILE_OFFSET_BITS=64
473.astar: -D_FILE_OFFSET_BITS=64
483.xalancbmk: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LINUX

### Base Optimization Flags

**C benchmarks:**

```
-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch
-opt-mem-layout-trans=3
```
SPEC CINT2006 Result

Hewlett Packard Enterprise
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CPU2006 license: 3
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Tested by: HPE

Base Optimization Flags (Continued)

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

Peak Compiler Invocation

C benchmarks (except as noted below):
icc -m32 -L/opt/intel/compilers_and_libraries_2016/linux/compiler/lib/ia32_lin

400.perlbench: icc -m64
401.bzip2: icc -m64
456.hmmer: icc -m64
458.sjeng: icc -m64

C++ benchmarks:
icpc -m32 -L/opt/intel/compilers_and_libraries_2016/linux/compiler/lib/ia32_lin

Peak Portability Flags

400.perlbench: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX_X64
401.bzip2: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LP64
403.gcc: -D_FILE_OFFSET_BITS=64
429.mcf: -D_FILE_OFFSET_BITS=64
445.gobmk: -D_FILE_OFFSET_BITS=64
456.hmmer: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LP64
458.sjeng: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LP64
462.libquantum: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LINUX
464.h264ref: -D_FILE_OFFSET_BITS=64
471.omnetpp: -D_FILE_OFFSET_BITS=64
473.astar: -D_FILE_OFFSET_BITS=64
483.xalancbmk: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LINUX
Hewlett Packard Enterprise  
(Test Sponsor: HPE)  
ProLiant XL450 Gen9  
(2.10 GHz, Intel Xeon E5-2695 v4)  

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CPU2006 license: 3  
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Tested by: HPE  
Software Availability: Nov-2015  

Peak Optimization Flags

C benchmarks:
400.perlbench: "-xCORE-AVX2" (pass 2)  
  "-prof-gen:threadsafepass1"  
  "-ipo" (pass 2)  
  "-par-num-threads=1" (pass 1)  
  "-prof-use" (pass 2)  
  "-auto-ilp32"  
401.bzip2: "-xCORE-AVX2" (pass 2)  
  "-prof-gen:threadsafepass1"  
  "-ipo" (pass 2)  
  "-par-num-threads=1" (pass 1)  
  "-prof-use" (pass 2)  
  "-opt-prefetch"  
  "-auto-ilp32"  
  "-ansi-alias"  
403.gcc: "-xCORE-AVX2"  
  "-ipo -O3 -no-prec-div"  
429.mcf: basepeak = yes  
445.gobmk: "-xCORE-AVX2" (pass 2)  
  "-prof-gen:threadsafepass1"  
  "-par-num-threads=1" (pass 1)  
  "-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:threadsafepass1"  
  "-ipopp" (pass 2)  
  "-par-num-threads=1" (pass 1)  
  "-prof-use" (pass 2)  
  "-unroll4"  
  "-auto-ilp32"  
462.libquantum: basepeak = yes  
464.h264ref: "-xCORE-AVX2" (pass 2)  
  "-prof-gen:threadsafepass1"  
  "-ipopp" (pass 2)  
  "-par-num-threads=1" (pass 1)  
  "-prof-use" (pass 2)  
  "-unroll2"  
  "-ansi-alias"  
C++ benchmarks:
471.omnetpp: "-xCORE-AVX2" (pass 2)  
  "-prof-gen:threadsafepass1"  
  "-ipopp" (pass 2)  
  "-par-num-threads=1" (pass 1)  
  "-opt-ra-region-strategy=block -Wl,-z,muldefs -L/sh -lsmartheap"  
473.astar: basepeak = yes  
483.xalancbmk: basepeak = yes
## SPEC CINT2006 Result

**Hewlett Packard Enterprise**
(Test Sponsor: HPE)

**ProLiant XL450 Gen9**
(2.10 GHz, Intel Xeon E5-2695 v4)

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**CPU2006 license:** 3  
**Test sponsor:** HPE  
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**Tested by:** HPE  
**Software Availability:** Nov-2015

### 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-ic16.0-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-ic16.0-official-linux64.xml  
http://www.spec.org/cpu2006/flags/HP-Platform-Flags-Intel-V1.2-HSW-revE.xml

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For questions about this result, please contact the tester.  
For other inquiries, please contact webmaster@spec.org.

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