Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant ML350 Gen9
(2.60 GHz, Intel Xeon E5-2690 v4)

SPECI\textsuperscript{2006} = 71.6
SPECI\textsubscript{2006} \textsubscript{base} = 68.5

CPU\textsuperscript{2006} license: 3
Test sponsor: HPE
Tested by: HPE

Test date: Apr-2016
Hardware Availability: Mar-2016
Software Availability: Dec-2015

Hardware

<table>
<thead>
<tr>
<th>Test</th>
<th>Score</th>
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</thead>
<tbody>
<tr>
<td>400.perlbench</td>
<td>41.8</td>
</tr>
<tr>
<td>401.bzip2</td>
<td>24.8</td>
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<tr>
<td>403.gcc</td>
<td>37.7</td>
</tr>
<tr>
<td>429.mcf</td>
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<tr>
<td>445.gobmk</td>
<td>30.3</td>
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<tr>
<td>456.hmmer</td>
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<td>458.sjeng</td>
<td>35.0</td>
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<tr>
<td>462.libquantum</td>
<td>34.6</td>
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<tr>
<td>464.h264ref</td>
<td>58.0</td>
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<tr>
<td>471.omnetpp</td>
<td>56.1</td>
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<td>473.astar</td>
<td>42.6</td>
</tr>
<tr>
<td>483.xalancbmk</td>
<td>85.3</td>
</tr>
</tbody>
</table>

Software

Operating System: SUSE Linux Enterprise Server 12 (x86_64) SP1 3.12.49-11-default
Compiler: C++ Version 16.0.0.101 of Intel C++ Studio XE for Linux
Auto Parallel: Yes
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 32/64-bit
Peak Pointers: 32/64-bit
Other Software: Microquill SmartHeap V10.2
Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Seconds Base</th>
<th>Ratio Base</th>
<th>Seconds Peak</th>
<th>Ratio Peak</th>
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<td>75.0</td>
<td>92.0</td>
<td>75.0</td>
</tr>
</tbody>
</table>

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Submit Notes

The config file option 'submit' was used.

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

Platform Notes

BIOS Configuration:
- Intel Hyperthreading Option set to Disabled
- Power Profile set to Custom
- Power Regulator set to Static High Performance Mode
- Minimum Processor Idle Power Core C-State set to C1E State
- Minimum Processor Idle Power Package C-State set to No Package State
- Collaborative Power Control set to Disabled
- QPI Snoop Configuration set to Home Snoop
- Thermal Configuration set to Maximum Cooling
- Processor Power and Utilization Monitoring set to Disabled
- Memory Double Refresh Rate set to 1x Refresh
- Energy Performance Bias set to Maximum Performance

Sysinfo program /home/specuser/cpu2006/ic16/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e8219e1
running on linux-szds Thu Apr 14 14:54:55 2016

This section contains SUT (System Under Test) info as seen by
Hewlett Packard Enterprise
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SPECint2006 = 71.6
SPECint_base2006 = 68.5

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 E5-2690 v4@ 2.60GHz
  2 "physical id"s (chips)
    28 "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 : 14
    siblings  : 14
    physical 0: cores 0 2 4 5 6 8 9 10 11 12 13 14
    physical 1: cores 0 2 4 5 6 8 9 10 11 12 13 14
    cache size : 35840 KB

From /proc/meminfo
  MemTotal:       529094216 kB
  HugePages_Total:       0
  Hugepagesize:       2048 kB

/usr/bin/lsb_release -d
SUSE Linux Enterprise Server 12 SP1

From /etc/*release* /etc/*version*
SuSE-release:
  NAME="SLES"
  VERSION="12-SP1"
  VERSION_ID="12.1"
  PRETTY_NAME="SUSE Linux Enterprise Server 12 SP1"
  ID="sles"
  ANSI_COLOR="0;32"
  CPE_NAME="cpe:/o:suse:sles:12:sp1"

uname -a:
(8d714a0) x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Apr 14 14:31

SPEC is set to: /home/specuser/cpu2006/ic16
  Filesystem Type Size Used Avail Use% Mounted on
  /dev/sda4 xfs 703G 279G 424G 40% /home

Additional information from dmidecode:

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SPEC CINT2006 Result

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Platform Notes (Continued)
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 P92 03/23/2016
Memory:
8x UNKNOWN NOT AVAILABLE
16x 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 512 GB and the dmidecode description should have one line reading as:
16x UNKNOWN NOT AVAILABLE 32 GB 2 rank 2400 MHz

General Notes
Environment variables set by runspec before the start of the run:
KMP_AFFINITY = "granularity=fine,scatter"
LD_LIBRARY_PATH = "'/home/specuser/cpu2006/ic16/libs/32:/home/specuser/cpu2006/ic16/libs/64:/home/specuser/cpu2006/ic16/sh"
OMP_NUM_THREADS = "28"

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 -m64

C++ benchmarks:
  icpc -m64

Base Portability Flags

400.perlbench: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX_X64
401.bzip2: -DSPEC_CPU_LP64
403.gcc: -DSPEC_CPU_LP64
  429.mcf: -DSPEC_CPU_LP64
445.gobmk: -DSPEC_CPU_LP64
456.hmmer: -DSPEC_CPU_LP64
458.sjeng: -DSPEC_CPU_LP64
462.libquantum: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX
464.h264ref: -DSPEC_CPU_LP64
471.omnetpp: -DSPEC_CPU_LP64
473.astar: -DSPEC_CPU_LP64

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Hewlett Packard Enterprise  
ProLiant ML350 Gen9  
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HPE  

**SPECint2006 = 71.6**  
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**CPU2006 license:** 3  
**Test sponsor:** HPE  
**Test date:** Apr-2016  
**Tested by:** HPE  
**Hardware Availability:** Mar-2016  
**Software Availability:** Dec-2015

### Base Portability Flags (Continued)

- 483.xalancbmk: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX

### Base Optimization Flags

**C benchmarks:**

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

**C++ benchmarks:**

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

- -Wl,-z,muldefs -L/sh -lsmartheap64

### Base Other Flags

**C benchmarks:**

- 403.gcc: -Dalloca=_alloca

### Peak Compiler Invocation

**C benchmarks (except as noted below):**

- icc  
- -m64

- 400.perlbench: icc  
- -m32  
- -L/opt/intel/compilers_and_libraries_2016/linux/compiler/lib/ia32_lin

**C++ benchmarks (except as noted below):**

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

- 473.astar: icpc  
- -m64

### Peak Portability Flags

- 400.perlbench: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LP64  
- -DSPEC_CPU_LINUX_IA32

- 401.bzip2: -DSPEC_CPU_LP64

- 403.gcc: -DSPEC_CPU_LP64

- 429.mcf: -DSPEC_CPU_LP64

- 445.gobmk: -DSPEC_CPU_LP64

- 456.hmmer: -DSPEC_CPU_LP64

- 458.sjeng: -DSPEC_CPU_LP64

- 462.libquantum: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX

- 464.h264ref: -DSPEC_CPU_LP64

- 471.omnetpp: -D_FILE_OFFSET_BITS=64

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Hewlett Packard Enterprise  
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Peak Portability Flags (Continued)

473.astar: -D SPEC_CPU_LP64
483.xalancbmk: -D_FILE_OFFSET_BITS=64 -D SPEC_CPU_LINUX

Peak Optimization Flags

C benchmarks:

400.perlbench: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)  
-ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)  
-par-num-threads=1(pass 1) -prof-use(pass 2) -opt-prefetch  
-ansi-alias

401.bzip2: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)  
-ipo(pass 2) -O3(pass 2) -no-prec-div  
-par-num-threads=1(pass 1) -prof-use(pass 2) -auto-ilp32  
-opt-prefetch -ansi-alias

403.gcc: basepeak = yes
429.mcf: basepeak = yes
445.gobmk: basepeak = yes
456.hmmer: basepeak = yes
458.sjeng: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)  
-ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)  
-par-num-threads=1(pass 1) -prof-use(pass 2) -unroll4

462.libquantum: basepeak = yes
464.h264ref: basepeak = yes

C++ benchmarks:

471.omnetpp: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)  
-ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)  
-par-num-threads=1(pass 1) -prof-use(pass 2)  
-opt-ra-region-strategy=block -ansi-alias  
-Wl,-z,muldefs -L/sh -lsmartheap

473.astar: basepeak = yes
483.xalancbmk: -xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch  
-ansi-alias -Wl,-z,muldefs -L/sh -lsmartheap
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**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/HP-Platform-Flags-Intel-V1.2-HSW-revE.html  
http://www.spec.org/cpu2006/flags/Intel-ic16.0-official-linux64.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-HSW-revE.xml  
http://www.spec.org/cpu2006/flags/Intel-ic16.0-official-linux64.xml

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

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