## SPEC® CINT2006 Result

**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
ProLiant DL380 Gen9  
(2.40 GHz, Intel Xeon E5-2640 v3)

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

<table>
<thead>
<tr>
<th>Software</th>
<th>Operating System:</th>
<th>Hardware</th>
<th>CPU Name:</th>
<th>Intel Xeon E5-2640 v3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compiler:</td>
<td>C/C++: Version 16.0.0.101 of Intel C++ StudioXE for Linux</td>
<td>CPU Characteristics:</td>
<td>Intel Turbo Boost Technology up to 3.40 GHz</td>
<td></td>
</tr>
<tr>
<td>Auto Parallel:</td>
<td>No</td>
<td>CPU MHz:</td>
<td>2600</td>
<td></td>
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<tr>
<td>File System:</td>
<td>ext3</td>
<td>CPU(s) enabled:</td>
<td>16 cores, 2 chips, 8 cores/chip, 2 threads/core</td>
<td></td>
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<tr>
<td>System State:</td>
<td>Run level 3 (multi-user)</td>
<td>CPU(s) orderable:</td>
<td>1, 2 chips</td>
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<tr>
<td>Base Pointers:</td>
<td>32-bit</td>
<td>Primary Cache:</td>
<td>32 KB I + 32 KB D on chip per core</td>
<td></td>
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<tr>
<td>Peak Pointers:</td>
<td>32/64-bit</td>
<td>Secondary Cache:</td>
<td>256 KB I+D on chip per core</td>
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<td>Other Software:</td>
<td>Microquill SmartHeap V10.2</td>
<td>L3 Cache:</td>
<td>20 MB I+D on chip per chip</td>
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</tbody>
</table>

| Other Cache: | None | Memory: | 256 GB (16 x 16 GB 2Rx4 PC4-2133P-R, running at 1866 MHz) |
| Disk Subsystem: | 2 x 300 GB 15 K SAS, RAID 1 | Other Hardware: | None |

### SPECint_rate2006 = 748  
SPECint_rate_base2006 = 714

### Test date:  
Feb-2016  
Hardware Availability: Sep-2014  
Software Availability: Dec-2015

### Results

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>SPECint_rate2006</th>
<th>SPECint_rate_base2006</th>
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</thead>
<tbody>
<tr>
<td>400.perlbench</td>
<td>32</td>
<td>634</td>
<td>501</td>
</tr>
<tr>
<td>401.bzip2</td>
<td>32</td>
<td>347</td>
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<td>403.gcc</td>
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<td>429.mcf</td>
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<td>445.gobmk</td>
<td>32</td>
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<td>462.libquantum</td>
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<td>464.h264ref</td>
<td>32</td>
<td>413</td>
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<td>471.omnetpp</td>
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<tr>
<td>473.astar</td>
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<td>483.xalancbmk</td>
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<td>6960</td>
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SPECint_rate_base2006 = 714

SPECint_rate2006 = 748
### Results Table

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<td>869</td>
<td>254</td>
<td>869</td>
<td>253</td>
<td>872</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`
runcspec command invoked through `numactl` i.e.:
`numactl --interleave=all runspec <etc>`

### Platform Notes

BIOS Configuration:
- HP Power Profile set to Custom
- HP Power Regulator to HP Static High Performance Mode
- Minimum Processor Idle Power Core State set to C6 State
- Minimum Processor Idle Power Package State set to No Package State
- QPI Snoop Configuration set to Early Snoop
- Collaborative Power Control set to Disabled
- Thermal Configuration set to Maximum Cooling
- Processor Power and Utilization Monitoring set to Disabled
- Memory Refresh Rate set to 1x Refresh

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(2.40 GHz, Intel Xeon E5-2640 v3)

SPECint_rate2006 = 748
SPECint_rate_base2006 = 714

CPU2006 license: 3
Test sponsor: HPE
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Platform Notes (Continued)

Sysinfo program /cpu/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
running on pl185 Tue Feb 16 14:42:37 2016

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 E5-2640 v3 @ 2.60GHz
  2 "physical id"s (chips)
  32 "processors"
cores, siblings (Caution: counting these is hw and system dependent. The
following excerpts from /proc/cpuinfo might not be reliable. Use with
cautions.)
cpu cores : 8
siblings : 16
physical 0: cores 0 1 2 3 4 5 6 7
physical 1: cores 0 1 2 3 4 5 6 7
cache size : 20480 KB

From /proc/meminfo
MemTotal:       264554492 kB
HugePages_Total:       0
Hugepagesize:       2048 kB

From /etc/*release* /etc/*version*
SuSE-release:
  SUSE Linux Enterprise Server 12 (x86_64)
  VERSION = 12
  PATCHLEVEL = 1
  # This file is deprecated and will be removed in a future service pack or
  # release.
  # Please check /etc/os-release for details about this release.
  os-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:
Linux pl185 3.12.49-11-default #1 SMP Wed Nov 11 20:52:43 UTC 2015 (8d714a0)
x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Feb 16 14:42

SPEC is set to: /cpu

Filesystem     Type  Size  Used Avail Use% Mounted on
/dev/sdal     ext3  275G  38G  224G  15% /
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<th>SPECint_rate2006</th>
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<td>SPECint_rate_base2006</td>
<td>714</td>
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Platform Notes (Continued)

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 P89 08/26/2014
Memory:
16x HP 752369-081 16 GB 2 rank 2133 MHz, configured at 1866 MHz
8x UNKNOWN NOT AVAILABLE

(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:
16x HP 752369-081 16 GB 2 rank 2133 MHz, configured at 1866 MHz

General Notes

Environment variables set by runspec before the start of the run:
LD_LIBRARY_PATH = "/cpu/libs/32:/cpu/libs/64:/cpu/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

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# SPEC CINT2006 Result

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<table>
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<tr>
<th>Date</th>
<th>Value</th>
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<tbody>
<tr>
<td>Test date</td>
<td>Feb-2016</td>
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</tr>
</tbody>
</table>

## Base Portability Flags (Continued)

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`

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`
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Peak Portability Flags (Continued)

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

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) -auto-ilp32

401.bzip2: -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
-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:threadsafe(pass 1)
-prof-use(pass 2) -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:threadsafe(pass 1)
-ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)
-par-num-threads=1(pass 1) -prof-use(pass 2) -unroll14
-auto-ilp32

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) -ansi-alias
-opt-ra-region-strategy=block -Wl,-z,muldefs
-L/sh -lsmartheap

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Peak Optimization Flags (Continued)

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-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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