## SPEC® CINT2006 Result

**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
ProLiant BL460 Gen9  
(2.40 GHz, Intel Xeon E5-2640 v4)

### SPECint Rate2006 = 898  
SPECint_rate_base2006 = 860

| Test date: | Jan-2017 |
| Hardware Availability: | Mar-2016 |
| Software Availability: | Sep-2016 |

### Hardware

| CPU Name: | Intel Xeon E5-2640 v4 |
| CPU Characteristics: | Intel Turbo Boost Technology up to 3.40 GHz |
| CPU MHz: | 2400 |
| FPU: | Integrated |
| CPU(s) enabled: | 20 cores, 2 chips, 10 cores/chip, 2 threads/core |
| CPU(s) orderable: | 1, 2 chips |
| Primary Cache: | 32 KB I + 32 KB D on chip per core |
| Secondary Cache: | 256 KB I+D on chip per core |
| L3 Cache: | 25 MB I+D on chip per chip |
| Other Cache: | None |
| Memory: | 128 GB (8 x 16 GB 2Rx4 PC4-2400T-R, running at 2133 MHz) |
| Disk Subsystem: | 2 x 600 GB 10 K SAS HDD, RAID 1 |
| Other Hardware: | None |

### Software

| Operating System: | SUSE Linux Enterprise Server 12 (x86_64) SP1 Kernel 3.12.49-11-default |
| Compiler: | C/C++: Version 17.0.0.098 of Intel C/C++ Compiler 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 |
### Results Table

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<td>1010</td>
<td>272</td>
<td>1010</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 by default
- 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:
  - Power Profile set to Custom
  - Power Regulator set to Static High Performance Mode
  - Minimum Processor Idle Power Core C-State set to C6 State
  - Minimum Processor Idle Power Package C-State set to No Package State
  - Collaborative Power Control set to Disabled
  - 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 /cpu/config/sysinfo.rev6993
- Revision 6993 of 2015-11-06 (b5e8dd4eb51ed28d7f98696cbe290c1)
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(2.40 GHz, Intel Xeon E5-2640 v4)

SPECint_rate2006 = 898
SPECint_rate_base2006 = 860

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

Platform Notes (Continued)

running on PL37 Thu Jan 26 10:14:22 2017

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 v4 @ 2.40GHz
  2 "physical id"s (chips)
  40 "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 : 20
  physical 0: cores 0 1 2 3 4 8 9 10 11 12
  physical 1: cores 0 1 2 3 4 8 9 10 11 12
  cache size : 25600 KB

From /proc/meminfo
MemTotal: 13215552 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 PL37 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 Jan 26 10:05

SPEC is set to: /cpu
  Filesystem Type Size Used Avail Use% Mounted on
  /dev/sda2 xfs 559G 13G 546G 3% /
  Additional information from dmidecode:

Continued on next page
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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 I36 02/22/2016
Memory:
8x HP 809081-081 16 GB 2 rank 2400 MHz, configured at 2133 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 128 GB and the dmidecode description should have one line reading as:
8x HP 809081-081 16 GB 2 rank 2400 MHz, configured at 2133 MHz

General Notes
Environment variables set by runspec before the start of the run:
LD_LIBRARY_PATH = "/cpu/libs/32:/cpu/libs/64:/cpu/sh10.2"

Binaries compiled on a system with 1x Intel Core i7-4790K CPU + 32GB RAM memory using Redhat Enterprise Linux 7.2

Base Compiler Invocation

C benchmarks:
icc -m32 -L/opt/intel/compilers_and_libraries_2017/linux/lib/ia32

C++ benchmarks:
icpc -m32 -L/opt/intel/compilers_and_libraries_2017/linux/lib/ia32

Base Portability Flags
400.perlbench: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LINUX_IA32
401.zipf: -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`  
- `-qopt-prefetch`  
- `-qopt-mem-layout-trans=3`

C++ benchmarks:
- `-xCORE-AVX2`  
- `-ipo`  
- `-O3`  
- `-no-prec-div`  
- `-qopt-prefetch`  
- `-qopt-mem-layout-trans=3`  
- `-Wl,-z,muldefs`  
- `-L/sh10.2`  
- `-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_2017/linux/lib/ia32`
  
  400.perlbench: `icc`  
  
  401.bzip2: `icc`  
  
  456.hmmer: `icc`  
  
  458.sjeng: `icc`  

C++ benchmarks:
- `icpc`: `-m32`  
- `-L/opt/intel/compilers_and_libraries_2017/linux/lib/ia32`

### Peak Portability Flags

400.perlbench: `-DSPEC_CPU_LP64`  
401.bzip2: `-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: `-DSPEC_CPU_LP64`  
458.sjeng: `-DSPEC_CPU_LP64`  
462.libquantum: `-D_FILE_OFFSET_BITS=64`  
464.h264ref: `-D_FILE_OFFSET_BITS=64`  
471.omnetpp: `-D_FILE_OFFSET_BITS=64`  
473.astar: `-D_FILE_OFFSET_BITS=64`
Peak Portability Flags (Continued)

483.xalancbmk: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LINUX

Peak Optimization Flags

C benchmarks:

400.perbench: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
  -par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
  -no-prec-div(pass 2) -auto-ilp32 -qopt-mem-layout-trans=3

401.bzip2: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
  -par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
  -no-prec-div(pass 2) -qopt-prefetch -auto-ilp32
  -qopt-mem-layout-trans=3

403.gcc: -xCORE-AVX2 -ipo -O3 -no-prec-div
  -qopt-mem-layout-trans=3

429.mcf: basepeak = yes

445.gobmk: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
  -par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
  -no-prec-div(pass 2) -qopt-mem-layout-trans=3

456.hmmer: -xCORE-AVX2 -ipo -O3 -no-prec-div -unroll2 -auto-ilp32
  -qopt-mem-layout-trans=3

458.sjeng: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
  -par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
  -no-prec-div(pass 2) -unroll4 -auto-ilp32
  -qopt-mem-layout-trans=3

462.libquantum: basepeak = yes

464.h264ref: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
  -par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
  -no-prec-div(pass 2) -unroll2 -qopt-mem-layout-trans=3

C++ benchmarks:

471.omnetpp: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
  -par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
  -no-prec-div(pass 2)
  -qopt-ra-region-strategy=block
  -qopt-mem-layout-trans=3 -Wl,-z,muldefs
  -L/sh10.2 -lsmartheap

Continued on next page
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**Peak Optimization Flags (Continued)**

473.astar: basepeak = yes
483.xalancbmk: basepeak = yes

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**Peak Other Flags**

C benchmarks:

403.gcc: -Dalloca=_alloca

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The flags files that were used to format this result can be browsed at

http://www.spec.org/cpu2006/flags/Intel-ic17.0-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-ic17.0-official-linux64.xml
http://www.spec.org/cpu2006/flags/HP-Platform-Flags-Intel-V1.2-HSW-revE.xml

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

Tested with SPEC CPU2006 v1.2.