Hewlett Packard Enterprise
(Test Sponsor: HPE)

Integrity Superdome X
(144 core, 2.50 GHz, Intel Xeon E7-8890 v3)

| SPECint_rate2006 | 5570 |
| SPECint_rate_base2006 | 5340 |

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

CPU Name: Intel Xeon E7-8890 v3
CPU Characteristics: Intel Turbo Boost Technology up to 3.30 GHz
CPU MHz: 2500
FPU: Integrated
CPU(s) enabled: 144 cores, 8 chips, 18 cores/chip, 2 threads/core
CPU(s) orderable: 2 to 16 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: 45 MB I+D on chip per chip
Other Cache: None
Memory: 2 TB (128 x 16 GB 2Rx4 PC4-2133P-L, running at 1600 MHz)
Disk Subsystem: 8 x C8S59A, 900 GB 10 K RPM SAS
Other Hardware: None

Operating System: SUSE Linux Enterprise Server 11 (x86_64) SP3
Kernel 3.0.101-0.47.55-bigxmp
Compiler: C/C++: Version 16.0.0.101 of Intel C++ Studio XE for Linux
Auto Parallel: No
File System: tmpfs
System State: Run level 3 (multi-user)
Base Pointers: 32-bit
Peak Pointers: 32/64-bit
Other Software: Microquill SmartHeap V10.2
Updated libgcc_s1, glibc, and libstdc++6

Test date: Oct-2015
Hardware Availability: Oct-2015
Software Availability: Aug-2015

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**SPEC CINT2006 Result**

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### Results Table

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<td>345</td>
<td>1.00</td>
<td>5770</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"

```
intel_idle.max_cstate=1 appended in kernel command line
```

Power profile set with:
```
cpupower -c all frequency-set -g performance
```

Benchmark installed under /dev/shm/cpu2006 and mounted with:
```
mount -o bind /dev/shm/cpu2006 /cpu2006
```

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
```

numactl --interleave=all runspec <etc>

To run the Intel binaries based off the Intel 16.0 compiler (with SLES11 SP3), the following software was updated:
```
libgcc_s1 (32 and 64-bit versions) to version 4.8.3+r212056-6.3
glibc (32 and 64-bit versions) to version 2.19-17.72
libstdc++6 (32 and 64-bit versions) to version 4.8.3+r212056-6.3
```
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Platform Notes

Firmware settings:
Memory RAS Configuration set to Maximum Performance
Sysinfo program /cpu2006/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
running on hawk050os1 Mon Oct 26 11:10:33 2015

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 E7-8890 v3 @ 2.50GHz
8 "physical id"s (chips)
288 "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 8 9 10 11 16 17 18 19 20 24 25 26 27
physical 1: cores 0 1 2 3 8 9 10 11 16 17 18 19 20 24 25 26 27
physical 2: cores 0 1 2 3 8 9 10 11 16 17 18 19 20 24 25 26 27
physical 3: cores 0 1 2 3 8 9 10 11 16 17 18 19 20 24 25 26 27
physical 4: cores 0 1 2 3 8 9 10 11 16 17 18 19 20 24 25 26 27
physical 5: cores 0 1 2 3 8 9 10 11 16 17 18 19 20 24 25 26 27
physical 6: cores 0 1 2 3 8 9 10 11 16 17 18 19 20 24 25 26 27
physical 7: cores 0 1 2 3 8 9 10 11 16 17 18 19 20 24 25 26 27
cache size : 46080 KB

From /proc/meminfo
MemTotal: 2117695720 kB
HugePages_Total: 0
Hugepagesize: 2048 kB
/usr/bin/lsb_release -d
SUSE Linux Enterprise Server 11 (x86_64)

From /etc/*release* /etc/*version*
SuSE-release:
SUSE Linux Enterprise Server 11 (x86_64)
VERSION = 11
PATCHLEVEL = 3
uname -a:
Linux hawk050os1 3.0.101-0.47.55-bigsmpl #1 SMP Thu May 28 08:25:11 UTC 2015 (dc033ee) x86_64 x86_64 x86_64 GNU/Linux
run-level 3 Oct 26 10:56 last=S

SPEC is set to: /cpu2006
Filesystem Type Size Used Avail Use% Mounted on
tmpfs tmpfs 1010G 3.8G 1007G 1% /dev/shm

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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 Bundle: 007.005.000 SFW: 033.161.000 07/18/2015
Memory:
103x HP 36ASF2G72LZ-2G1A1 16 GB 2133 MHz, configured at 1600 MHz
12x HP HMA42GL7MR4N-TF 16 GB 2133 MHz, configured at 1600 MHz
13x HP M386A2G40DB0-CPB 16 GB 2133 MHz, configured at 1600 MHz
64x not defined not defined

(End of data from sysinfo program)
Regarding the sysinfo display about the memory installed, the correct amount of memory is 2 TB and the dmidecode description should have three lines reading as:
103x HP 36ASF2G72LZ-2G1A1 16 GB 2133 MHz, configured at 1600 MHz
12x HP HMA42GL7MR4N-TF 16 GB 2133 MHz, configured at 1600 MHz
13x HP M386A2G40DB0-CPB 16 GB 2133 MHz, configured at 1600 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_andlibraries_2016/linux/compiler/lib/ia32_lin

C++ benchmarks:
icpc -m32 -L/opt/intel/compilers_andlibraries_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

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**Base Portability Flags (Continued)**

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:
- \(-xCORE\_AVX2\)
- \(-ipo\)
- \(-O3\)
- \(-no-prec-div\)
- \(-opt-prefetch\)
- \(-opt-mem-layout-trans=3\)

C++ benchmarks:
- \(-xCORE\_AVX2\)
- \(-ipo\)
- \(-O3\)
- \(-no-prec-div\)
- \(-opt-prefetch\)
- \(-opt-mem-layout-trans=3\)
- \(-Wl,-z,mutldefs\) \(-L/sh\) \(-lsmartheap\)

**Base Other Flags**

C benchmarks:
- \(-Dalloca=\_alloca\)

**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: \(-D\_FILE\_OFFSET\_BITS=64\) \(-DSPEC\_CPU\_LP64\) \(-DSPEC\_CPU\_LINUX\_X64\)

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Peak Portability Flags (Continued)

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

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) -unroll4
-auto-ilp32

462.libquantum: basepeak = yes

464.h264ref: -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) -unroll2
-ansi-alias

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Software Availability: Aug-2015

Peak Optimization Flags (Continued)

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

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-Integrity-revA.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-Integrity-revA.xml

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