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

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

### SPECint2006 = 42.6
SPECint_base2006 = 40.7

#### Hardware
- **CPU Name:** Intel Xeon E7-4820 v4
- **CPU Characteristics:**
  - CPU MHz: 2000
  - FPU: Integrated
  - CPU(s) enabled: 40 cores, 4 chips, 10 cores/chip
  - CPU(s) orderable: 2.4 chip
  - 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: 512 GB (32 x 16 GB 2Rx4 PC4-2400T-R, running at 1333 MHz)
  - Disk Subsystem: 1 x 800 GB NVMe PCIe SSD, RAID 0
  - Other Hardware: DL580 Gen9 NVMe SSD Express Bay Enablement Kit

#### Software
- **Operating System:** SUSE Linux Enterprise Server 12 (x86_64) SP1, Kernel 3.12.49-11-default
- **Compiler:** CIC++: 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-bit
- **Peak Pointers:** 32/64-bit
- **Other Software:** Microquill SmartHeap V10.2

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- **400.perlbench:** 14.9
- **401.bzip2:** 22.6
- **403.gcc:** 40.1
- **429.mcf:** 47.4
- **445.gobmk:** 19.9
- **456.hmmer:** 20.1
- **458.sjeng:** 19.9
- **462.libquantum:** 35.1
- **464.h264ref:** 28.9
- **471.omnetpp:** 21.8
- **473.astar:** 19.1
- **483.xalancbmk:** 44.3

**SPECint2006 = 42.6**
**SPECint_base2006 = 40.7**
## Results Table

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<td>44.2</td>
<td>140</td>
<td>49.1</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:
- HP Power Profile set to Custom
- HP Power Regulator to HP Static High Performance Mode
- Minimum Processor Idle Power Core C-State set to C6 State
- Minimum Processor Idle Power Package C-State set to Package C6 (retention) State
- Energy/Performance Bias set to Maximum Performance
- QPI Snoop Configuration set to Home Snoop
- Collaborative Power Control set to Disabled
- Thermal Configuration set to Maximum Cooling
- Processor Power and Utilization Monitoring set to Disabled
- Intel Hyperthreading set to Disabled

Sysinfo program /home/intel_binary/cpu2006/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 $$ e3fbb8667b5a285932ceab81e28219e1
running on linux-vi0i Tue Sep 27 13:27:00 2016

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

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL580 Gen9
(2.00 GHz, Intel Xeon E7-4820 v4)

SPECint2006 = 42.6
SPECint_base2006 = 40.7

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

Test date: Sep-2016
Hardware Availability: Aug-2016
Software Availability: Dec-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 E7-4820 v4 @ 2.00GHz
4 "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
care.)
cpu cores : 10
siblings : 10
physical 0: cores 0 2 3 4 8 9 10 11 12
physical 1: cores 0 2 3 4 8 9 10 11 12
physical 2: cores 0 2 3 4 8 9 10 11 12
physical 3: cores 0 2 3 4 8 9 10 11 12
cache size : 25600 KB

From /proc/meminfo
MemTotal: 529321304 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 linux-vi0i 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 Sep 27 13:20

SPEC is set to: /home/intel_binary/cpu2006
Filesystem Type Size Used Avail Use% Mounted on
/dev/nvme0n1p4 xfs 703G 107G 597G 16% /home
Additional information from dmidecode:
Warning: Use caution when you interpret this section. The 'dmidecode' program
Continued on next page
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL580 Gen9
(2.00 GHz, Intel Xeon E7-4820 v4)

SPECint2006 = 42.6
SPECint_base2006 = 40.7

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

Platform Notes (Continued)
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 U17 08/06/2016
Memory:
64x UNKNOWN NOT AVAILABLE
32x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2400 MHz, configured at 1333 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:
32x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2400 MHz, configured at 1333 MHz

General Notes
Environment variables set by runspec before the start of the run:
KMP_AFFINITY = "granularity=fine,compact"
OMP_NUM_THREADS = "40"
LD_LIBRARY_PATH = "/home/intel_binary/cpu2006/libs/32:/home/intel_binary/cpu2006/libs/64:/home/intel_binary/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  -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
483.xalancbmk: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL580 Gen9
(2.00 GHz, Intel Xeon E7-4820 v4)

SPECint2006 = 42.6
SPECint_base2006 = 40.7

CPU2006 license: 3
Test date: Sep-2016
Test sponsor: HPE
Hardware Availability: Aug-2016
Tested by: HPE
Software Availability: Dec-2015

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_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
473.astar: -DSPEC_CPU_LP64
483.xalancbmk: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LINUX
# SPEC CINT2006 Result

**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
ProLiant DL580 Gen9  
(2.00 GHz, Intel Xeon E7-4820 v4)  

| SPECint2006 = | 42.6 |
| SPECint_base2006 = | 40.7 |

- **CPU2006 license:** 3  
- **Test sponsor:** HPE  
- **Tested by:** HPE  
- **Test date:** Sep-2016  
- **Hardware Availability:** Aug-2016  
- **Software Availability:** Dec-2015  

## Peak Optimization Flags

**C benchmarks:**

```plaintext
400.perlbench:
-xCORE-AVX2(pass 2)  
-prof-gen:threadsafe(pass 1)  
-ipo(pass 2)  
-03(pass 2)  
-no-prec-div(pass 2)  
-par-num-threads=1(pass 1)  
-prof-use(pass 2)  
-opt-prefetch  
-ansi-alias
```

```plaintext
401.bzip2:
-xCORE-AVX2(pass 2)  
-prof-gen:threadsafe(pass 1)  
-ipo(pass 2)  
-03(pass 2)  
-no-prec-div  
-par-num-threads=1(pass 1)  
-prof-use(pass 2)  
-auto-ilp32  
-opt-prefetch  
-ansi-alias
```

```plaintext
403.gcc: basepeak = yes
```

```plaintext
429.mcf: basepeak = yes
```

```plaintext
445.gobmk: basepeak = yes
```

```plaintext
456.hmmer: basepeak = yes
```

```plaintext
458.sjeng:
-xCORE-AVX2(pass 2)  
-prof-gen:threadsafe(pass 1)  
-ipo(pass 2)  
-03(pass 2)  
-no-prec-div(pass 2)  
-par-num-threads=1(pass 1)  
-prof-use(pass 2)  
-unroll4
```

```plaintext
462.libquantum: basepeak = yes
```

```plaintext
464.h264ref: basepeak = yes
```

**C++ benchmarks:**

```plaintext
471.omnetpp:
-xCORE-AVX2(pass 2)  
-prof-gen:threadsafe(pass 1)  
-ipo(pass 2)  
-03(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
```

```plaintext
473.astar: basepeak = yes
```

```plaintext
483.xalancbmk:
-xCORE-AVX2  
-ipo  
-03  
-no-prec-div  
-opt-prefetch  
-ansi-alias  
-Wl,-z,muldefs -L/sh -lsmartheap
```

## Peak Other Flags

**C benchmarks:**

```plaintext
403.gcc: -Dalloca=_alloca
```
Hewlett Packard Enterprise  
(Test Sponsor: HPE)  
ProLiant DL580 Gen9  
(2.00 GHz, Intel Xeon E7-4820 v4)  

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<td>Software Availability: Dec-2015</td>
</tr>
</tbody>
</table>

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 other inquiries, please contact webmaster@spec.org.

Tested with SPEC CPU2006 v1.2.
Originally published on 18 October 2016.