SPEC® CINT2006 Result
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Hewlett Packard Enterprise
(Test Sponsor: HPE)

ProLiant XL420 Gen9
(2.30 GHz, Intel Xeon E5-2697 v4)

SPECint®2006 = 73.7
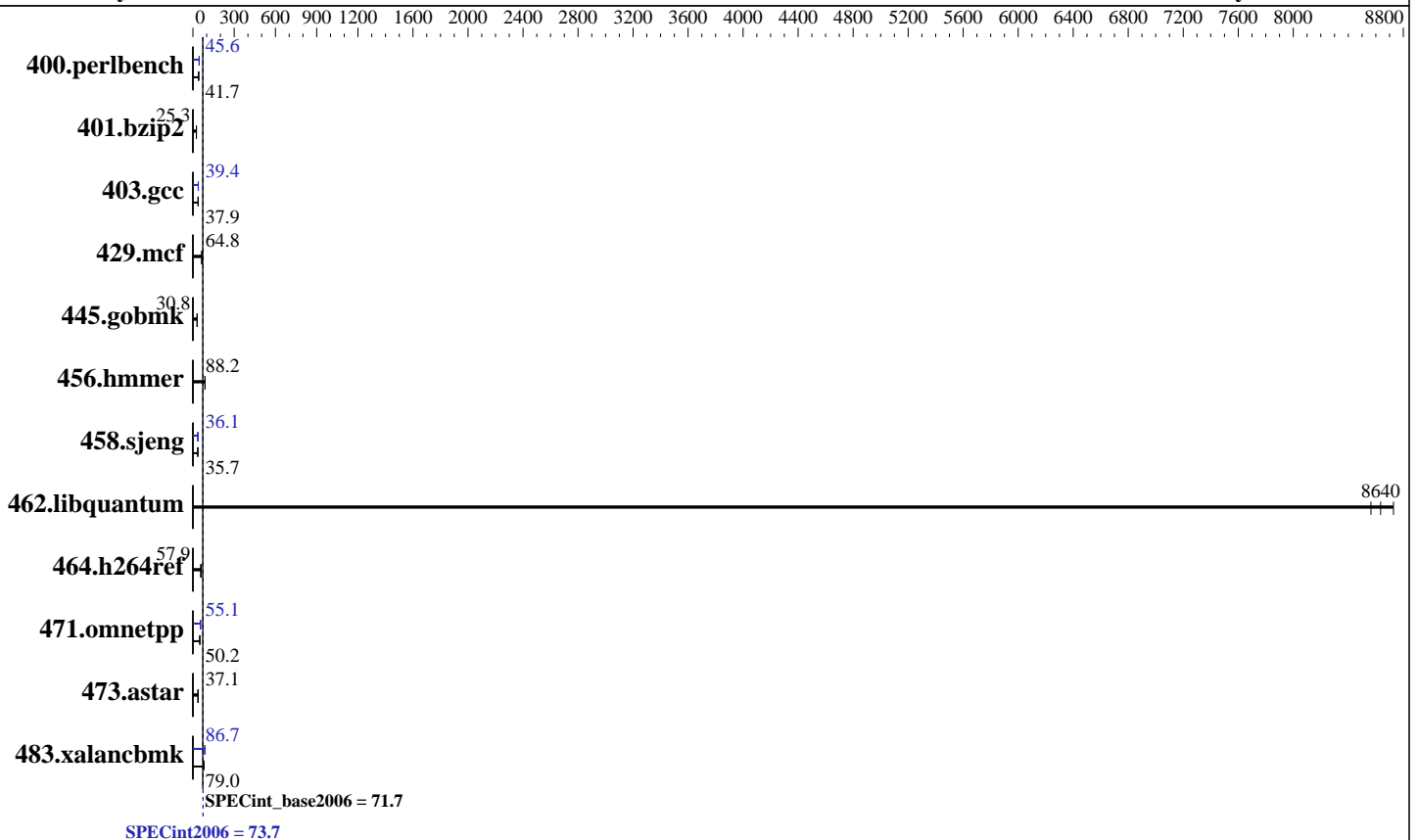
SPECint_base2006 = 71.7

CPU2006 license: 3

Test sponsor: HPE

Tested by: HPE

Test date: Jun-2016

Hardware Availability: Mar-2016

Software Availability: Dec-2015

0 300 600 900 1200 1600 2000 2400 2800 3200 3600 4000 4400 4800 5200 5600 6000 6400 6800 7200 7600 8000 8800	
400.perlbench	45.6 / 41.7
401.bzip2	25.3
403.gcc	39.4 / 37.9
429.mcf	64.8
445.gobmk	30.8
456.hmmer	88.2
458.sjeng	36.1 / 35.7
462.libquantum	8640
464.h264ref	57.9
471.omnetpp	55.1 / 50.2
473.astar	37.1
483.xalancbmk	86.7 / 79.0

SPECint_base2006 = 71.7

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Hardware

CPU Name:	Intel Xeon E5-2697 v4
CPU Characteristics:	Intel Turbo Boost Technology up to 3.60 GHz
CPU MHz:	2300
FPU:	Integrated
CPU(s) enabled:	36 cores, 2 chips, 18 cores/chip
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:	45 MB I+D on chip per chip
Other Cache:	None
Memory:	256 GB (8 x 32 GB 2Rx4 PC4-2400T-R)
Disk Subsystem:	2 x 400 GB SAS SSD, 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 16.0.0.101 of Intel C++ Studio XE for Linux
Auto Parallel:	Yes
File System:	btrfs
System State:	Run level 5 (multi-user, w/GUI)
Base Pointers:	32/64-bit
Peak Pointers:	32/64-bit
Other Software:	Microquill SmartHeap V10.2

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Results Table

Benchmark	Base						Peak					
	Seconds	**Ratio**	**Seconds**	**Ratio**	**Seconds**	**Ratio**	**Seconds**	**Ratio**	**Seconds**	**Ratio**	**Seconds**	**Ratio**
400.perlbench	235	41.5	**234**	**41.7**	234	41.7	**214**	**45.6**	214	45.6	216	45.3
401.bzip2	**381**	**25.3**	384	25.1	380	25.4	**381**	**25.3**	384	25.1	380	25.4
403.gcc	**213**	**37.9**	213	37.9	212	37.9	209	38.5	204	39.4	**204**	**39.4**
429.mcf	140	64.9	**141**	**64.8**	143	63.9	140	64.9	**141**	**64.8**	143	63.9
445.gobmk	**341**	**30.8**	341	30.8	341	30.8	**341**	**30.8**	341	30.8	341	30.8
456.hmmer	106	88.3	**106**	**88.2**	106	88.0	106	88.3	**106**	**88.2**	106	88.0
458.sjeng	**339**	**35.7**	339	35.7	340	35.6	335	36.1	**335**	**36.1**	335	36.1
462.libquantum	2.37	8730	**2.40**	**8640**	2.42	8560	2.37	8730	**2.40**	**8640**	2.42	8560
464.h264ref	382	58.0	382	57.9	**382**	**57.9**	382	58.0	382	57.9	**382**	**57.9**
471.omnetpp	**124**	**50.2**	123	50.7	126	49.6	**113**	**55.1**	113	55.2	114	55.0
473.astar	188	37.4	190	37.0	**189**	**37.1**	188	37.4	190	37.0	**189**	**37.1**
483.xalancbmk	87.2	79.2	87.4	78.9	**87.3**	**79.0**	79.7	86.6	79.3	87.1	**79.6**	**86.7**

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 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 C6 State
    Minimum Processor Idle Power Package C-State set to Package C6 (retention) State
    Energy/Performance Bias set to Balance 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
    Memory Double Refresh Rate set to 1x Refresh
    Memory Patrol Scrubbing set to Disabled

Sysinfo program /cpu2006/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
running on linux-s40o Fri Jun 10 04:44:11 2016

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Platform Notes (Continued)

```
   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 E5-2697 v4 @ 2.30GHz
         2 "physical id"s (chips)
         36 "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  : 18
         physical 0: cores 0 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
         physical 1: cores 0 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
      cache size : 46080 KB

   From /proc/meminfo
      MemTotal:       264217796 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:
         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-s40o 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 5 Jun 9 20:42

   SPEC is set to: /cpu2006
      Filesystem      Type   Size  Used Avail Use% Mounted on
      /dev/sda3       btrfs  370G   15G  354G   4% /
```
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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 U19 02/22/2016
    Memory:
     8x UNKNOWN NOT AVAILABLE
     8x 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 256 GB and the dmidecode description should have one line reading as:
  8x 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,compact"
  LD_LIBRARY_PATH = "/cpu2006/libs/32:/cpu2006/libs/64:/cpu2006/sh"
  OMP_NUM_THREADS = "36"

   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
```

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Base Portability Flags (Continued)

```
   471.omnetpp: -DSPEC_CPU_LP64
      473.astar: -DSPEC_CPU_LP64
 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_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
```

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Peak Portability Flags (Continued)

```
      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
```

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: basepeak = yes

         403.gcc: -xCORE-AVX2 -ipo -O3 -no-prec-div -inline-calloc
                  -opt-malloc-options=3 -auto-ilp32

        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/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

For questions about this result, please contact the tester.
For other inquiries, please contact webmaster@spec.org.

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