SPEC® CINT2006 Result

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant ML350 Gen9
(1.70 GHz, Intel Xeon E5-2609 v4)

$SPECint^{®}2006 =$ 37.1

$SPECint\_base2006 =$ 35.7

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

400.perlbench 22.4 / 20.6
401.bzip2 13.2 / 13.0
403.gcc 21.3 / 21.3
429.mcf 40.8 / 40.8
445.gobmk 14.9
456.hmmer 42.0
458.sjeng 17.7 / 17.5
462.libquantum 3420
464.h264ref 30.1
471.omnetpp 27.9 / 21.0
473.astar 18.9 / 18.9
483.xalancbmk 43.1 / 40.7

SPECint_base2006 = 35.7

SPECint2006 = 37.1

Hardware

CPU Name:	Intel Xeon E5-2609 v4
CPU Characteristics:	
CPU MHz:	1700
FPU:	Integrated
CPU(s) enabled:	16 cores, 2 chips, 8 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:	20 MB I+D on chip per chip
Other Cache:	None
Memory:	512 GB (16 x 32 GB 2Rx4 PC4-2400T-R, running at 1866 MHz)
Disk Subsystem:	1 x 800 GB SAS SSD, RAID 0
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:	xfs
System State:	Run level 3 (multi-user)
Base Pointers:	32/64-bit
Peak Pointers:	32/64-bit
Other Software:	Microquill SmartHeap V10.2

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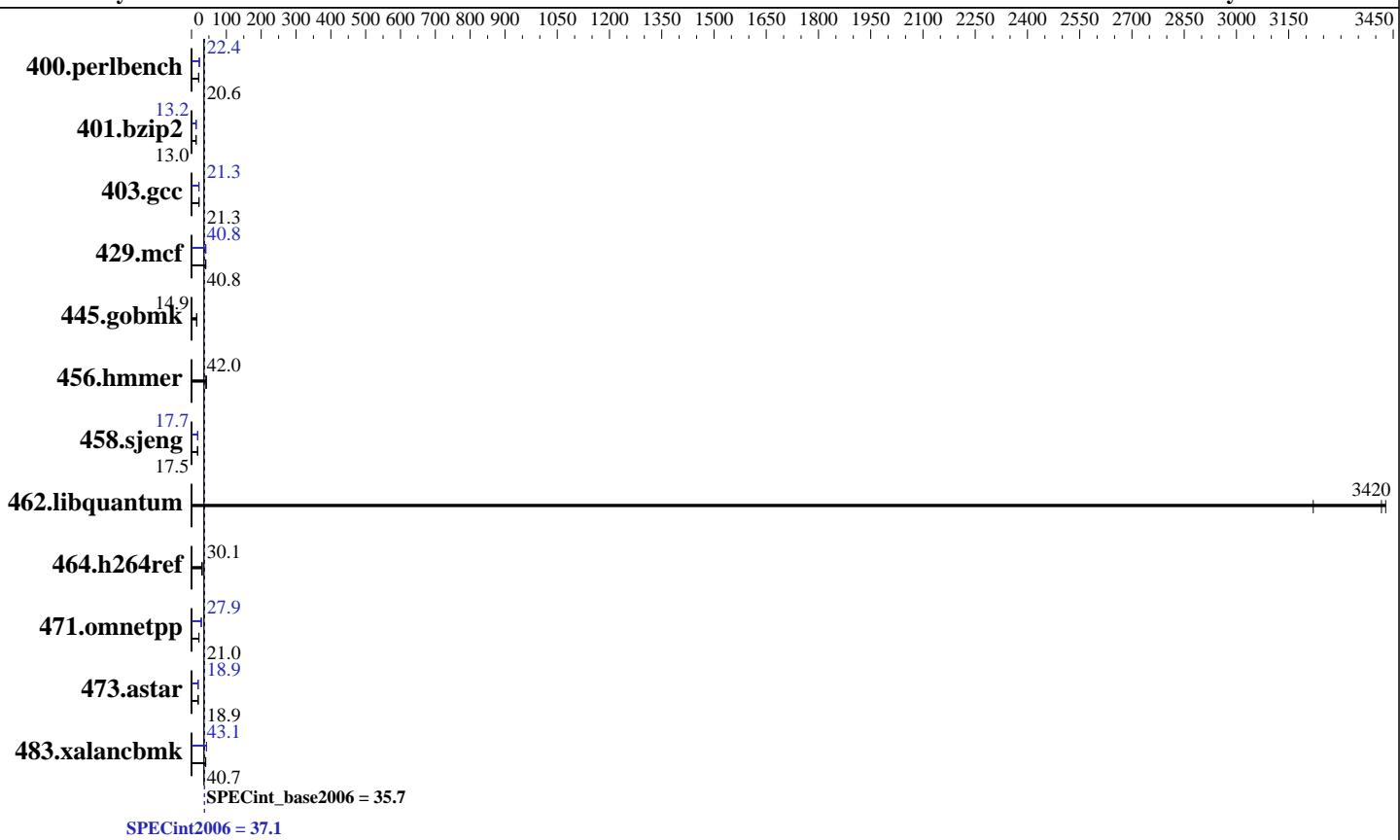SPECint2006 = 37.1

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Results Table

Benchmark	Base						Peak					
	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
400.perlbench	474	20.6	473	20.7	**474**	**20.6**	436	22.4	**436**	**22.4**	436	22.4
401.bzip2	**742**	**13.0**	746	12.9	739	13.1	**729**	**13.2**	729	13.2	729	13.2
403.gcc	377	21.3	**377**	**21.3**	378	21.3	**378**	**21.3**	378	21.3	380	21.2
429.mcf	224	40.7	223	40.8	**223**	**40.8**	225	40.6	222	41.0	**223**	**40.8**
445.gobmk	702	15.0	**702**	**14.9**	702	14.9	702	15.0	**702**	**14.9**	702	14.9
456.hmmer	**222**	**42.0**	222	42.1	223	41.9	**222**	**42.0**	222	42.1	223	41.9
458.sjeng	691	17.5	**690**	**17.5**	690	17.5	**683**	**17.7**	683	17.7	683	17.7
462.libquantum	6.04	3430	**6.06**	**3420**	6.43	3220	6.04	3430	**6.06**	**3420**	6.43	3220
464.h264ref	**735**	**30.1**	736	30.1	731	30.3	**735**	**30.1**	736	30.1	731	30.3
471.omnetpp	**298**	**21.0**	291	21.5	299	20.9	**224**	**27.9**	224	27.9	223	28.1
473.astar	**371**	**18.9**	370	19.0	373	18.8	372	18.9	372	18.9	**372**	**18.9**
483.xalancbmk	**170**	**40.7**	169	40.8	171	40.5	160	43.1	160	43.1	**160**	**43.1**

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:
  Power Profile set to Custom
  Power Regulator set to Static High Performance Mode
  Minimum Processor Idle Power Core C-State set to C1E State
  Minimum Processor Idle Power Package C-State set to No Package State
  Collaborative Power Control set to Disabled
  QPI Snoop Configuration set to Home Snoop
  Thermal Configuration set to Maximum Cooling
  Processor Power and Utilization Monitoring set to Disabled
  Memory Double Refresh Rate set to 1x Refresh
  Energy Performance Bias set to Maximum Performance
Sysinfo program /home/specuser/cpu2006/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
running on linux-7m51 Fri Jun  3 13:47:22 2016

This section contains SUT (System Under Test) info as seen by
some common utilities.  To remove or add to this section, see:
```

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Platform Notes (Continued)

```
   http://www.spec.org/cpu2006/Docs/config.html#sysinfo

 From /proc/cpuinfo
    model name : Intel(R) Xeon(R) CPU E5-2609 v4 @ 1.70GHz
       2 "physical id"s (chips)
       16 "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 : 8
       siblings  : 8
       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:       529095464 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-7m51 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 Jun 3 13:23

 SPEC is set to: /home/specuser/cpu2006
    Filesystem      Type  Size  Used Avail Use% Mounted on
    /dev/sda4       xfs   703G  236G  468G  34% /home
 Additional information from dmidecode:

    Warning: Use caution when you interpret this section. The 'dmidecode' program
```

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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 P92 04/12/2016
      Memory:
        8x UNKNOWN NOT AVAILABLE
        16x UNKNOWN NOT AVAILABLE 32 GB 2 rank 2400 MHz, configured at 1866 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:
     16x UNKNOWN NOT AVAILABLE 32 GB 2 rank 2400 MHz, configured at 1866 MHz
```

General Notes

```
Environment variables set by runspec before the start of the run:
KMP_AFFINITY = "granularity=fine,scatter"
LD_LIBRARY_PATH = "/home/specuser/cpu2006/libs/32:/home/specuser/cpu2006/libs/64:/home/specuser/cpu2006/sh"
OMP_NUM_THREADS = "16"

 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
```

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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

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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: `-xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)`
        `-ipo(pass 2) -O3(pass 2) -no-prec-div`
        `-par-num-threads=1(pass 1) -prof-use(pass 2) -auto-ilp32`
        `-opt-prefetch -ansi-alias`

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

        429.mcf: `-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel`
        `-opt-prefetch -auto-p32`

     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: `-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch`
        `-auto-p32 -Wl,-z,muldefs -L/sh -lsmartheap64`

  483.xalancbmk: `-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch`
        `-ansi-alias -Wl,-z,muldefs -L/sh -lsmartheap`

Peak Other Flags

C benchmarks:

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Peak Other Flags (Continued)

403.gcc: `-Dalloca=_alloca`

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2006/flags/HP-Platform-Flags-Intel-V1.2-HSW-revE.html
http://www.spec.org/cpu2006/flags/Intel-ic16.0-official-linux64.html

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You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/HP-Platform-Flags-Intel-V1.2-HSW-revE.xml
http://www.spec.org/cpu2006/flags/Intel-ic16.0-official-linux64.xml

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

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