SPEC® CINT2006 Result
Copyright 2006-2016 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise
(Test Sponsor: HPE)

$SPECint^{®}\_rate2006 =$ 433

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

$SPECint\_rate\_base2006 =$ 415

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

Test date: Jun-2016
Hardware Availability: Mar-2016
Software Availability: Dec-2015

SPECint_rate_base2006 = 415

SPECint_rate2006 = 433

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:	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

SPEC CINT2006 Result
Copyright 2006-2016 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise
(Test Sponsor: HPE)

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

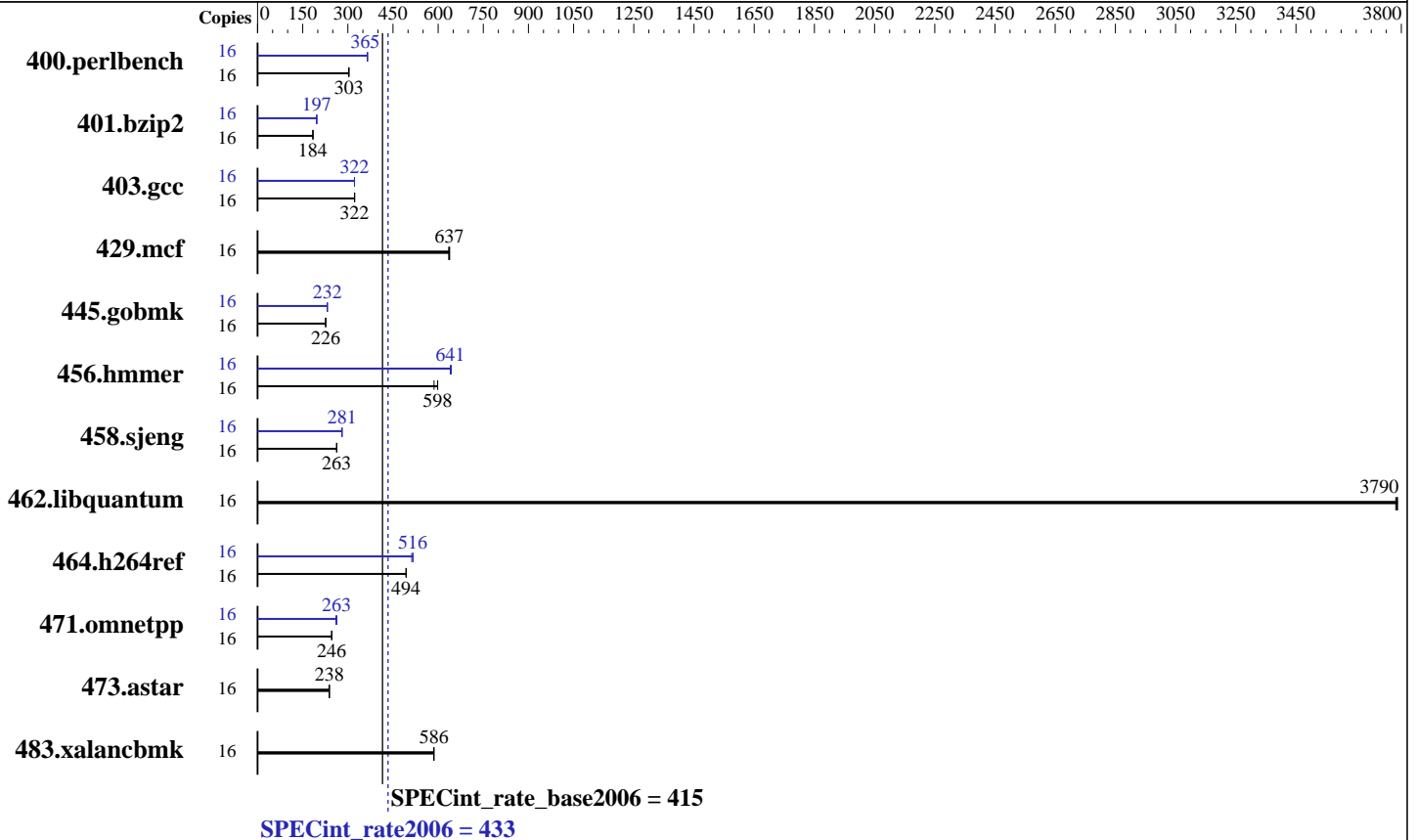$SPECint\_rate2006 =$ 433

$SPECint\_rate\_base2006 =$ 415

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

Results Table

Benchmark	Base						Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
400.perlbench	16	**516**	**303**	517	302	514	304	16	428	365	**428**	**365**	428	365
401.bzip2	16	840	184	**839**	**184**	839	184	16	784	197	**785**	**197**	787	196
403.gcc	16	399	323	400	322	**400**	**322**	16	**400**	**322**	400	322	400	322
429.mcf	16	**229**	**637**	230	635	229	638	16	**229**	**637**	230	635	229	638
445.gobmk	16	741	226	741	226	**741**	**226**	16	724	232	**724**	**232**	725	232
456.hmmer	16	**250**	**598**	249	598	255	586	16	**233**	**641**	233	640	232	644
458.sjeng	16	**736**	**263**	736	263	736	263	16	690	281	**690**	**281**	690	281
462.libquantum	16	**87.6**	**3790**	87.5	3790	87.7	3780	16	**87.6**	**3790**	87.5	3790	87.7	3780
464.h264ref	16	**717**	**494**	717	494	718	493	16	686	516	**686**	**516**	691	512
471.omnetpp	16	406	246	**406**	**246**	405	247	16	380	263	384	260	**381**	**263**
473.astar	16	471	239	**471**	**238**	472	238	16	471	239	**471**	**238**	472	238
483.xalancbmk	16	188	586	189	585	**188**	**586**	16	188	586	189	585	**188**	**586**

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 with:
    echo always > /sys/kernel/mm/transparent_hugepage/enabled
    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 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

Hewlett Packard Enterprise

(Test Sponsor: HPE)

SPECint_rate2006 =   433

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

SPECint_rate_base2006 = 415

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

Test date: Jun-2016
Hardware Availability: Mar-2016
Software Availability: Dec-2015

Platform Notes (Continued)

```
Sysinfo program /home/specuser/cpu2006/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
running on linux-7m51 Sun Jun  5 05:42:22 2016

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 E5-2609 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 5 05:38
```

Continued on next page

SPEC CINT2006 Result

Hewlett Packard Enterprise

(Test Sponsor: HPE)

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

SPECint_rate2006 =   433

SPECint_rate_base2006 = 415

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

Platform Notes (Continued)

```
   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
     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:
  LD_LIBRARY_PATH = "/home/specuser/cpu2006/libs/32:/home/specuser/cpu2006/libs/64:/home/specuser/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_and_libraries_2016/linux/compiler/lib/ia32_lin
```

C++ benchmarks:
```
    icpc -m32 -L/opt/intel/compilers_and_libraries_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
   462.libquantum: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LINUX
```

SPEC CINT2006 Result
Copyright 2006-2016 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise

(Test Sponsor: HPE)

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

SPECint_rate2006 =   433

SPECint_rate_base2006 = 415

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

Test date: Jun-2016
Hardware Availability: Mar-2016
Software Availability: Dec-2015

Base Portability Flags (Continued)

        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,muldefs -L/sh -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_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`
        401.bzip2: `-D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LP64`

Continued on next page

SPEC CINT2006 Result
Copyright 2006-2016 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise
(Test Sponsor: HPE)

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

SPECint_rate2006 =   433

SPECint_rate_base2006 = 415

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

Test date: Jun-2016
Hardware Availability: Mar-2016
Software Availability: Dec-2015

Peak Portability Flags (Continued)

```
        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
```

C++ benchmarks:

Continued on next page

SPEC CINT2006 Result
Copyright 2006-2016 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise
(Test Sponsor: HPE)

SPECint_rate2006 =   433

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

SPECint_rate_base2006 = 415

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

Peak Optimization Flags (Continued)

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/HP-Platform-Flags-Intel-V1.2-HSW-revE.html
http://www.spec.org/cpu2006/flags/Intel-ic16.0-official-linux64.html

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

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

Tested with SPEC CPU2006 v1.2.
Report generated on Tue Jun 28 17:30:52 2016 by SPEC CPU2006 PS/PDF formatter v6932.
Originally published on 28 June 2016.