SPEC® CINT2006 Result

Dell Inc.

$SPECint^®\_rate2006 =$ 1340

PowerEdge R830 (Intel Xeon E5-4610 v4, 1.80 GHz)

$SPECint\_rate\_base2006 =$ 1270

CPU2006 license: 55
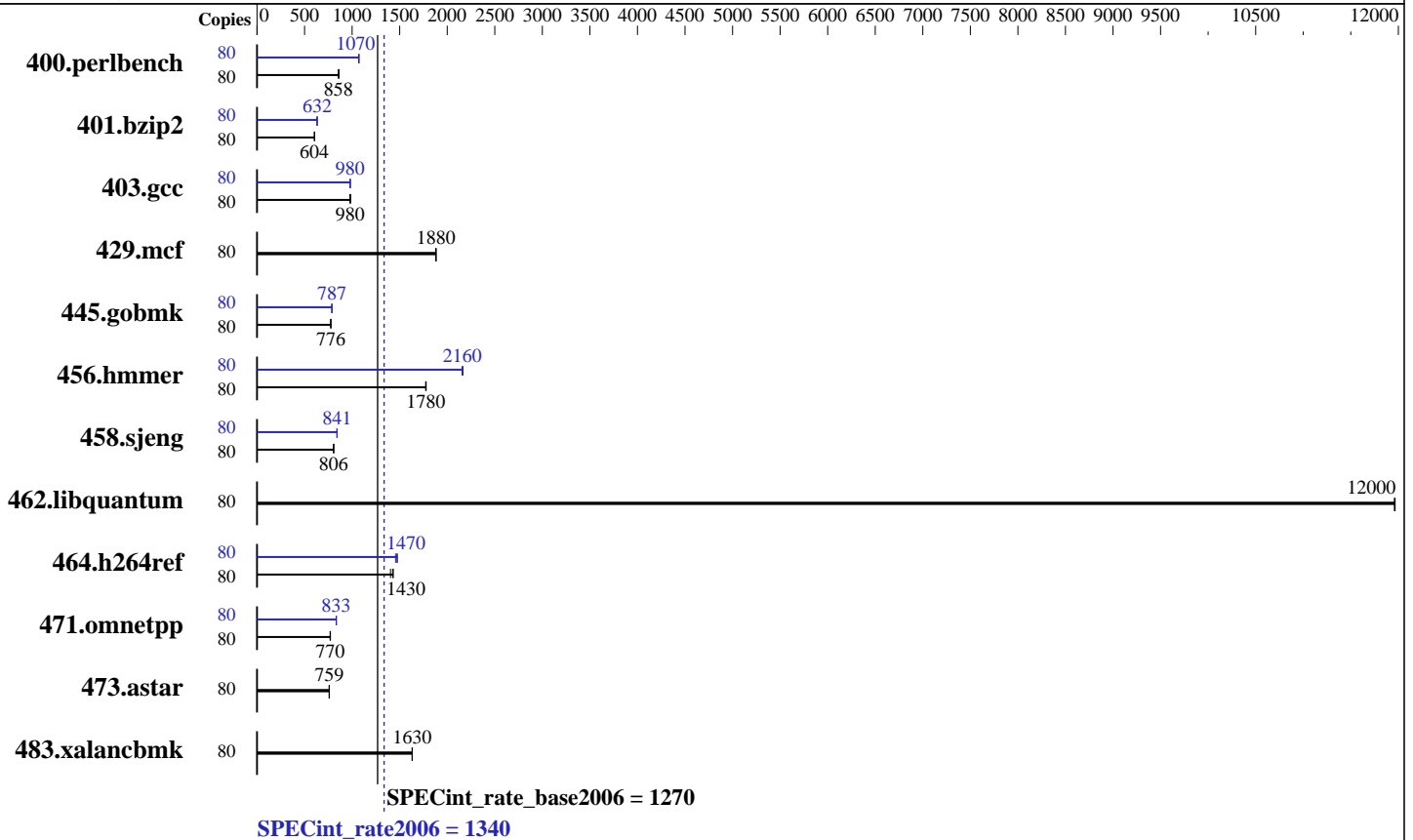
Test sponsor: Dell Inc.

Tested by: Dell Inc.

Test date: May-2016

Hardware Availability: Jun-2016

Software Availability: Mar-2016

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Hardware

CPU Name: Intel Xeon E5-4610 v4

CPU Characteristics:

CPU MHz: 1800

FPU: integrated

CPU(s) enabled: 40 cores, 4 chips, 10 cores/chip, 2 threads/core

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 2Rx8 PC4-2400T-R, running at 1866 MHz)

Disk Subsystem: 1 x 800 GB SATA SSD

Other Hardware: None

Software

Operating System: SUSE Linux Enterprise Server 12 SP1 3.12.49-11-default

Compiler: C/C++: Version 16.0.2.181 of Intel C++ Studio XE for Linux

Auto Parallel: No

File System: btrfs

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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Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
400.perlbench	80	908	861	912	857	**911**	**858**	80	729	1070	**730**	**1070**	731	1070
401.bzip2	80	1279	604	**1277**	**604**	1276	605	80	**1221**	**632**	1223	631	1220	633
403.gcc	80	654	985	**657**	**980**	660	976	80	657	981	**657**	**980**	658	979
429.mcf	80	**388**	**1880**	388	1880	388	1880	80	**388**	**1880**	388	1880	388	1880
445.gobmk	80	**1082**	**776**	1083	775	1080	777	80	**1066**	**787**	1065	788	1067	787
456.hmmer	80	**420**	**1780**	420	1780	421	1770	80	345	2170	346	2160	**346**	**2160**
458.sjeng	80	1202	806	1201	806	**1201**	**806**	80	**1151**	**841**	1150	841	1151	841
462.libquantum	80	139	12000	139	12000	**139**	**12000**	80	139	12000	139	12000	**139**	**12000**
464.h264ref	80	1261	1400	1235	1430	**1242**	**1430**	80	1199	1480	1215	1460	**1207**	**1470**
471.omnetpp	80	648	772	**649**	**770**	650	769	80	599	834	600	833	**600**	**833**
473.astar	80	**739**	**759**	740	759	739	760	80	**739**	**759**	740	759	739	760
483.xalancbmk	80	338	1630	**338**	**1630**	338	1630	80	338	1630	**338**	**1630**	338	1630

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"

Platform Notes

    BIOS settings:
    Snoop Mode set to Home Snoop
    Virtualization Technology disabled
    System Profile set to custom
    CPU Performance set to Hardware P States
    C States set to Autonomous
    C1E disabled
    Uncore Frequency set to Dynamic
    Energy Efficiency Policy set to Balanced Performance
    Memory Patrol Scrub disabled
    Sysinfo program /root/cpu2006-1.2/config/sysinfo.rev6914
    $Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
    running on linux-t2sb Fri May 27 09:09:07 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

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Platform Notes (Continued)

```
From /proc/cpuinfo
   model name : Intel(R) Xeon(R) CPU E5-4610 v4 @ 1.80GHz
      4 "physical id"s (chips)
      80 "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 : 10
      siblings  : 20
      physical 0: cores 0 1 2 3 4 8 9 10 11 12
      physical 1: cores 0 1 2 3 4 8 9 10 11 12
      physical 2: cores 0 1 2 3 4 8 9 10 11 12
      physical 3: cores 0 1 2 3 4 8 9 10 11 12
   cache size : 25600 KB

From /proc/meminfo
   MemTotal:       529326748 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-t2sb 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 May 27 09:07

SPEC is set to: /root/cpu2006-1.2
   Filesystem      Type   Size  Used Avail Use% Mounted on
   /dev/sda3       btrfs  461G  9.4G  451G   3% /
Additional information from dmidecode:
```

Continued on next page

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Platform Notes (Continued)

```
   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 Dell Inc. 1.0.2 05/13/2016
   Memory:
   31x 00AD063200AD HMA82GR7MFR8N-UH 16 GB 2 rank 2400 MHz, configured at 1866
   MHz
   1x 00CE00B300CE M393A2K43BB1-CRC 16 GB 2 rank 2400 MHz, configured at 1866
   MHz
   16x Not Specified Not Specified

 (End of data from sysinfo program)
```

General Notes

```
Environment variables set by runspec before the start of the run:
LD_LIBRARY_PATH = "/root/cpu2006-1.2/libs/32:/root/cpu2006-1.2/libs/64:/root/cpu2006-1.2/sh"

 Binaries compiled on a system with 1x Intel Core i7-4790K CPU + 32GB
 memory using RedHat EL 7.2 glibc 2.17
 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>
```

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
```

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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,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
```

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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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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/Dell-Platform-Settings-V1.2-revD.20151006.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/Dell-Platform-Settings-V1.2-revD.20151006.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 17:30:34 2016 by SPEC CPU2006 PS/PDF formatter v6932.
Originally published on 28 June 2016.