



# SPEC® CINT2006 Result

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Dell Inc.

SPECint®\_rate2006 = 3910

PowerEdge R940 (Intel Xeon Gold 6148, 2.40 GHz)

SPECint\_rate\_base2006 = 3730

CPU2006 license: 55

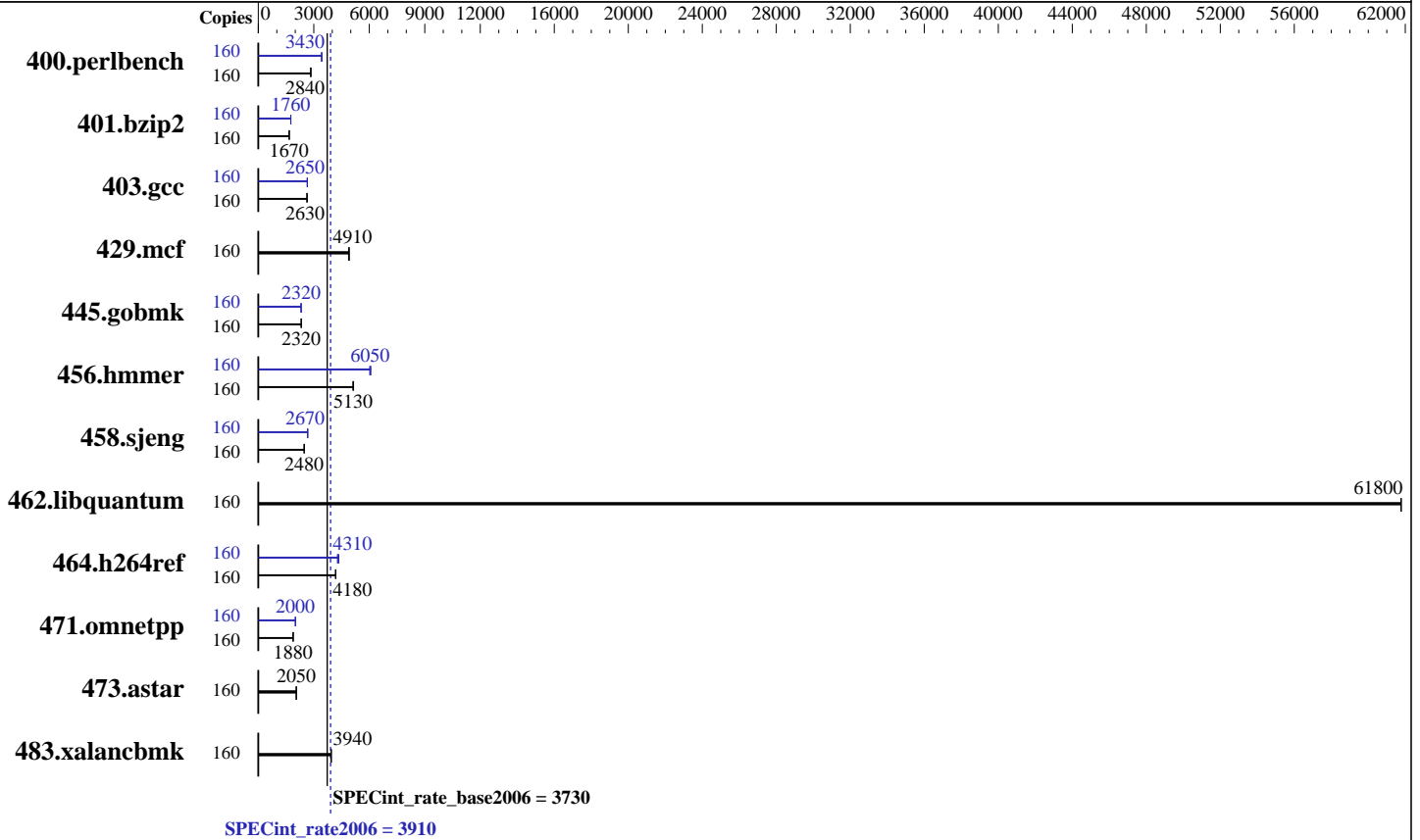
Test date: May-2017

Test sponsor: Dell Inc.

Hardware Availability: Jul-2017

Tested by: Dell Inc.

Software Availability: Nov-2016



## Hardware

CPU Name: Intel Xeon Gold 6148  
 CPU Characteristics: Intel Turbo Boost Technology up to 3.70 GHz  
 CPU MHz: 2400  
 FPU: Integrated  
 CPU(s) enabled: 80 cores, 4 chips, 20 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: 1 MB I+D on chip per core  
 L3 Cache: 27.5 MB I+D on chip per chip  
 Other Cache: None  
 Memory: 768 GB (48 x 16 GB 2Rx8 PC4-2666V-R)  
 Disk Subsystem: 1 x 960 GB SATA SSD  
 Other Hardware: None

## Software

Operating System: SUSE Linux Enterprise Server 12 SP2  
 4.4.21-69-default  
 Compiler: C/C++: Version 17.0.3.191 of Intel C/C++  
 Compiler 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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## Results Table

Benchmark	Base						Peak							
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
400.perlbench	160	550	2840	<u>551</u>	<u>2840</u>	551	2840	160	456	3430	<u>456</u>	<u>3430</u>	457	3420
401.bzip2	160	923	1670	926	1670	<u>924</u>	<u>1670</u>	160	877	1760	879	1760	<u>879</u>	<u>1760</u>
403.gcc	160	<u>489</u>	<u>2630</u>	488	2640	489	2630	160	<u>486</u>	<u>2650</u>	487	2640	485	2660
429.mcf	160	297	4910	<u>297</u>	<u>4910</u>	299	4880	160	297	4910	<u>297</u>	<u>4910</u>	299	4880
445.gobmk	160	723	2320	<u>723</u>	<u>2320</u>	723	2320	160	<u>725</u>	<u>2320</u>	724	2320	726	2310
456.hammer	160	292	5120	290	5150	<u>291</u>	<u>5130</u>	160	248	6020	<u>247</u>	<u>6050</u>	245	6090
458.sjeng	160	780	2480	<u>780</u>	<u>2480</u>	780	2480	160	726	2670	<u>725</u>	<u>2670</u>	725	2670
462.libquantum	160	<u>53.7</u>	<u>61800</u>	53.7	61800	53.7	61800	160	<u>53.7</u>	<u>61800</u>	53.7	61800	53.7	61800
464.h264ref	160	<u>847</u>	<u>4180</u>	846	4190	847	4180	160	813	4350	827	4280	<u>821</u>	<u>4310</u>
471.omnetpp	160	531	1880	<u>531</u>	<u>1880</u>	531	1880	160	<u>499</u>	<u>2000</u>	499	2000	497	2010
473.astar	160	545	2060	<u>547</u>	<u>2050</u>	548	2050	160	545	2060	<u>547</u>	<u>2050</u>	548	2050
483.xalancbmk	160	280	3940	280	3940	<u>280</u>	<u>3940</u>	160	280	3940	280	3940	<u>280</u>	<u>3940</u>

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:  
 Sub NUMA Cluster enabled  
 Virtualization Technology disabled  
 System Profile set to Custom  
 CPU Performance set to Maximum Performance  
 C States set to autonomous  
 C1E disabled  
 Uncore Frequency set to Dynamic  
 Energy Efficiency Policy set to Performance  
 Memory Patrol Scrub disabled  
 Logical Processor enabled  
 CPU Interconnect Bus Link Power Management disabled  
 PCI ASPM L1 Link Power Management disabled  
 Sysinfo program /home/cpu2006-1.2\_ic17u3/config/sysinfo.rev6993  
 Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)  
 running on linux-kj6v Sat May 27 00:55:40 2017

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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) Gold 6148 CPU @ 2.40GHz
 4 "physical id"s (chips)
160 "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 : 20
  siblings  : 40
  physical 0: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28
  physical 1: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28
  physical 2: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28
  physical 3: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28
cache size : 28160 KB

```

```

From /proc/meminfo
MemTotal:      791001148 kB
HugePages_Total:      0
Hugepagesize:    2048 kB

```

```

/usr/bin/lsb_release -d
SUSE Linux Enterprise Server 12 SP2

```

```

From /etc/*release* /etc/*version*
SuSE-release:
SUSE Linux Enterprise Server 12 (x86_64)
VERSION = 12
PATCHLEVEL = 2
# 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-SP2"
VERSION_ID="12.2"
PRETTY_NAME="SUSE Linux Enterprise Server 12 SP2"
ID="sles"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:12:sp2"

```

```

uname -a:
Linux linux-kj6v 4.4.21-69-default #1 SMP Tue Oct 25 10:58:20 UTC 2016
(9464f67) x86_64 x86_64 x86_64 GNU/Linux

```

run-level 3 May 27 00:54

```

SPEC is set to: /home/cpu2006-1.2_ic17u3
Filesystem      Type  Size  Used Avail Use% Mounted on

```

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## Platform Notes (Continued)

/dev/sda4 xfs 796G 6.5G 789G 1% /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 Dell Inc. 1.0.0 05/16/2017

Memory:

48x 00CE063200CE M393A2K43BB1-CTD 16 GB 2 rank 2666 MHz

(End of data from sysinfo program)

## General Notes

Environment variables set by runspec before the start of the run:

LD\_LIBRARY\_PATH = "/home/cpu2006-1.2\_ic17u3/lib/ia32:/home/cpu2006-1.2\_ic17u3/lib/intel64:/home/cpu2006-1.2\_ic17u3/sh10.2"

Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM  
memory using Redhat Enterprise Linux 7.2

Transparent Huge Pages enabled by default

Filesystem page cache cleared with:

shell invocation of 'sync; echo 3 > /proc/sys/vm/drop\_caches' prior to run

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\_2017/linux/lib/ia32

C++ benchmarks:

icpc -m32 -L/opt/intel/compilers\_and\_libraries\_2017/linux/lib/ia32

## 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  
464.h264ref: -D\_FILE\_OFFSET\_BITS=64

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## Base Portability Flags (Continued)

471.omnetpp: -D\_FILE\_OFFSET\_BITS=64  
473.aster: -D\_FILE\_OFFSET\_BITS=64  
483.xalancbmk: -D\_FILE\_OFFSET\_BITS=64 -DSPEC\_CPU\_LINUX

## Base Optimization Flags

C benchmarks:

-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch  
-qopt-mem-layout-trans=3

C++ benchmarks:

-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch  
-qopt-mem-layout-trans=3 -Wl,-z,muldefs -L/sh10.2 -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\_2017/linux/lib/ia32

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\_2017/linux/lib/ia32

## Peak Portability Flags

400.perlbench: -DSPEC\_CPU\_LP64 -DSPEC\_CPU\_LINUX\_X64  
401.bzip2: -DSPEC\_CPU\_LP64  
403.gcc: -D\_FILE\_OFFSET\_BITS=64

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## Peak Portability Flags (Continued)

429.mcf: -D\_FILE\_OFFSET\_BITS=64  
 445.gobmk: -D\_FILE\_OFFSET\_BITS=64  
 456.hmmer: -DSPEC\_CPU\_LP64  
 458.sjeng: -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: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512(pass 2)  
 -par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)  
 -no-prec-div(pass 2) -auto-ilp32 -qopt-mem-layout-trans=3

401.bzip2: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512(pass 2)  
 -par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)  
 -no-prec-div(pass 2) -qopt-prefetch -auto-ilp32  
 -qopt-mem-layout-trans=3

403.gcc: -xCORE-AVX512 -ipo -O3 -no-prec-div  
 -qopt-mem-layout-trans=3

429.mcf: basepeak = yes

445.gobmk: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512(pass 2)  
 -par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)  
 -no-prec-div(pass 2) -qopt-mem-layout-trans=3

456.hmmer: -xCORE-AVX512 -ipo -O3 -no-prec-div -unroll2 -auto-ilp32  
 -qopt-mem-layout-trans=3

458.sjeng: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512(pass 2)  
 -par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)  
 -no-prec-div(pass 2) -unroll4 -auto-ilp32  
 -qopt-mem-layout-trans=3

462.libquantum: basepeak = yes

464.h264ref: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512(pass 2)  
 -par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)  
 -no-prec-div(pass 2) -unroll2 -qopt-mem-layout-trans=3

C++ benchmarks:

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## Peak Optimization Flags (Continued)

```

471.omnetpp: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512(pass 2)
             -par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
             -no-prec-div(pass 2)
             -qopt-ra-region-strategy=block
             -qopt-mem-layout-trans=3 -Wl,-z,muldefs
             -L/sh10.2 -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-ic17.0-official-linux64-revF.html>

<http://www.spec.org/cpu2006/flags/Dell-Platform-Flags-PowerEdge14G-revB.html>

You can also download the XML flags sources by saving the following links:

<http://www.spec.org/cpu2006/flags/Intel-ic17.0-official-linux64-revF.xml>

<http://www.spec.org/cpu2006/flags/Dell-Platform-Flags-PowerEdge14G-revB.xml>

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