SPEC® CINT2006 Result
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Cisco Systems

Cisco UCS B200 M4 (Intel Xeon E5-2698 v4, 2.20 GHz)

SPECint®_rate2006 = 1640

SPECint_rate_base2006 = 1580

CPU2006 license: 9019	**Test date:** Aug-2016
Test sponsor: Cisco Systems	**Hardware Availability:** Apr-2016
Tested by: Cisco Systems	**Software Availability:** Dec-2015

Copies

- 400.perlbench: 80 — 1540; 80 — 1240
- 401.bzip2: 80 — 846; 80 — 820
- 403.gcc: 80 — 1180; 80 — 1170
- 429.mcf: 80 — 2040
- 445.gobmk: 80 — 1150; 80 — 1110
- 456.hmmer: 80 — 2290; 80 — 2090
- 458.sjeng: 80 — 1250; 80 — 1180
- 462.libquantum: 80 — 16500
- 464.h264ref: 80 — 2050; 80 — 2020
- 471.omnetpp: 80 — 800; 80 — 785
- 473.astar: 80 — 874
- 483.xalancbmk: 80 — 1590

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Hardware

CPU Name:	Intel Xeon E5-2698 v4
CPU Characteristics:	Intel Turbo Boost Technology up to 3.60 GHz
CPU MHz:	2200
FPU:	Integrated
CPU(s) enabled:	40 cores, 2 chips, 20 cores/chip, 2 threads/core
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:	50 MB I+D on chip per chip
Other Cache:	None
Memory:	256 GB (16 x 16 GB 2Rx4 PC4-2400T-R)
Disk Subsystem:	1 x 400 GB SAS SSD
Other Hardware:	None

Software

Operating System:	SUSE Linux Enterprise Server 12 SP1 (x86_64) 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

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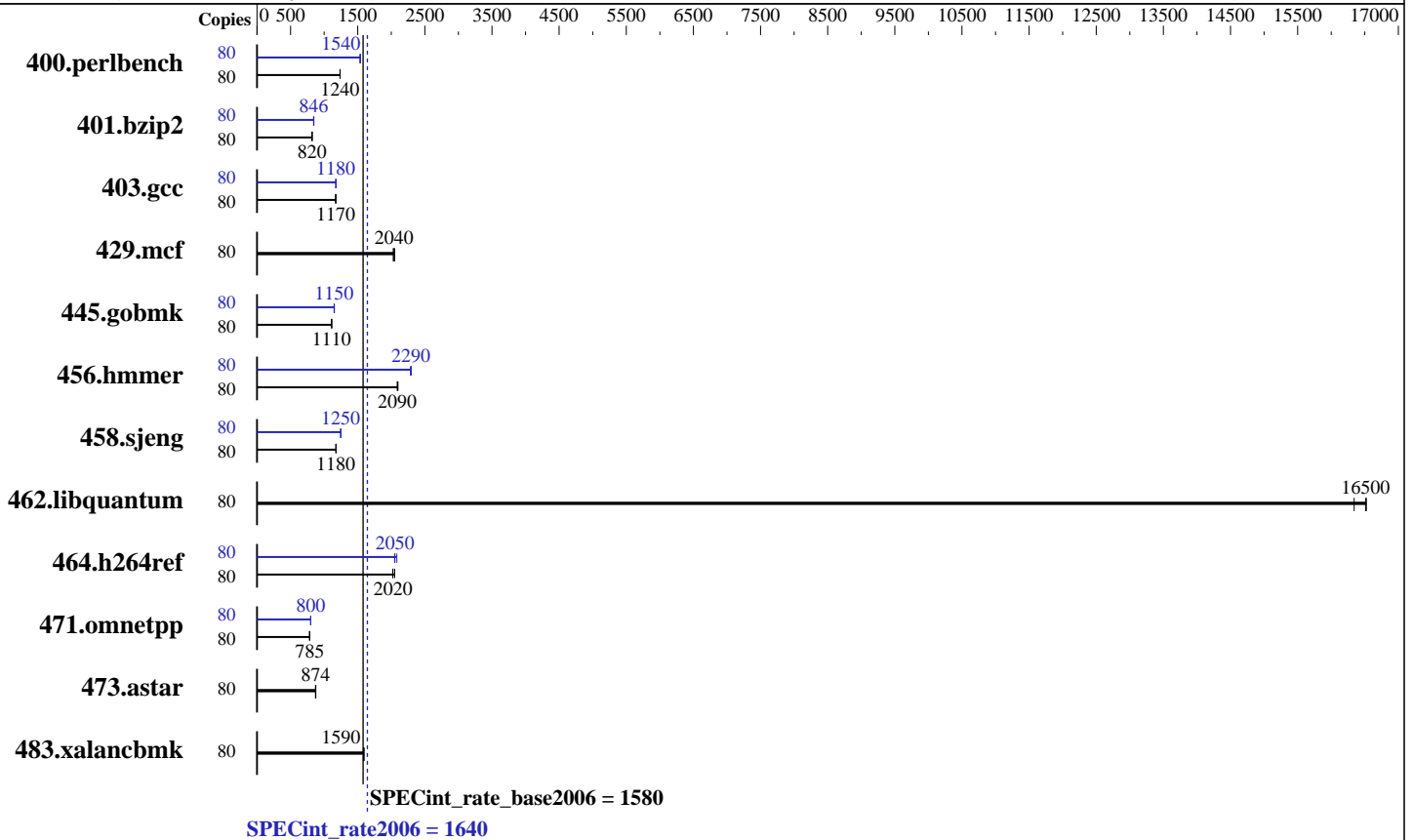
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Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
400.perlbench	80	631	1240	633	1240	**632**	**1240**	80	507	1540	**508**	**1540**	510	1530
401.bzip2	80	939	822	**941**	**820**	943	819	80	917	842	**913**	**846**	912	846
403.gcc	80	549	1170	549	1170	**549**	**1170**	80	547	1180	**547**	**1180**	549	1170
429.mcf	80	360	2030	**358**	**2040**	356	2050	80	360	2030	**358**	**2040**	356	2050
445.gobmk	80	754	1110	**755**	**1110**	756	1110	80	**729**	**1150**	731	1150	728	1150
456.hmmer	80	357	2090	355	2100	**357**	**2090**	80	326	2290	**325**	**2290**	325	2300
458.sjeng	80	822	1180	824	1180	**823**	**1180**	80	**776**	**1250**	777	1250	775	1250
462.libquantum	80	101	16300	100	16500	**100**	**16500**	80	101	16300	100	16500	**100**	**16500**
464.h264ref	80	875	2020	**874**	**2020**	863	2050	80	850	2080	863	2050	**862**	**2050**
471.omnetpp	80	637	785	**637**	**785**	639	782	80	625	800	**625**	**800**	626	799
473.astar	80	641	876	645	871	**642**	**874**	80	641	876	645	871	**642**	**874**
483.xalancbmk	80	346	1590	**347**	**1590**	348	1580	80	346	1590	**347**	**1590**	348	1580

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:
CPU performance set to Enterprise
Power Technology set to Energy Efficient
Energy Performance BIAS setting set to Balanced Performance
Memory RAS configuration set to Maximum Performance
Memory Power Saving Mode set to Disabled
QPI Snoop Mode set to Cluster-on-Die
 Sysinfo program /opt/cpu2006-1.2/config/sysinfo.rev6914
 $Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
 running on linux-volx Tue Aug 30 10:49:16 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 E5-2698 v4 @ 2.20GHz
```

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Platform Notes (Continued)

```
     2 "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 : 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
  cache size : 25600 KB

From /proc/meminfo
   MemTotal:       264561116 kB
   HugePages_Total:       0
   Hugepagesize:       2048 kB

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-volx 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 Aug 30 10:14

SPEC is set to: /opt/cpu2006-1.2
   Filesystem      Type  Size  Used Avail Use% Mounted on
   /dev/sdb1       xfs   350G   11G  340G   4% /
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 Cisco Systems, Inc. B200M4.3.1.1.11.110420151758 11/04/2015
 Memory:
   16x 0xAD00 HMA42GR7AFR4N-UH 16 GB 2 rank 2400 MHz
```

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Platform Notes (Continued)

```
    8x NO DIMM NO DIMM

 (End of data from sysinfo program)
```

General Notes

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

 Binaries compiled on a system with 1x Intel Core i5-4670K CPU + 32GB
 memory using RedHat EL 7.1
 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
    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
```

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Base Optimization Flags (Continued)

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
         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
```

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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) -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:

> 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`

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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/Cisco-Platform-Settings-V1.2-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/Cisco-Platform-Settings-V1.2-revE.xml

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