SPEC® CFP2006 Result

H3C

H3C UniServer R4900 G3 (Intel Xeon Gold 6140)

$SPECfp®_rate2006 = $ 1390

$SPECfp_rate_base2006 = $ 1360

CPU2006 license: 9066
Test sponsor: H3C
Tested by: H3C

Test date: Aug-2017
Hardware Availability: Jul-2017
Software Availability: Sep-2016

SPECfp_rate_base2006 = 1360

SPECfp_rate2006 = 1390

Hardware

CPU Name:	Intel Xeon Gold 6140
CPU Characteristics:	Intel Turbo Boost Technology up to 3.70 GHz
CPU MHz:	2300
FPU:	Integrated
CPU(s) enabled:	36 cores, 2 chips, 18 cores/chip, 2 threads/core
CPU(s) orderable:	1,2 chip
Primary Cache:	32 KB I + 32 KB D on chip per core
Secondary Cache:	1 MB I+D on chip per core

Continued on next page

Software

Operating System:	Red Hat Enterprise Linux Server release 7.3 (Maipo) 3.10.0-514.26.2.el7.x86_64
Compiler:	C/C++: Version 17.0.0.098 of Intel C/C++ Compiler for Linux; Fortran: Version 17.0.0.098 of Intel Fortran Compiler for Linux
Auto Parallel:	Yes
File System:	xfs

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$SPECfp\_rate2006 =$ 1390
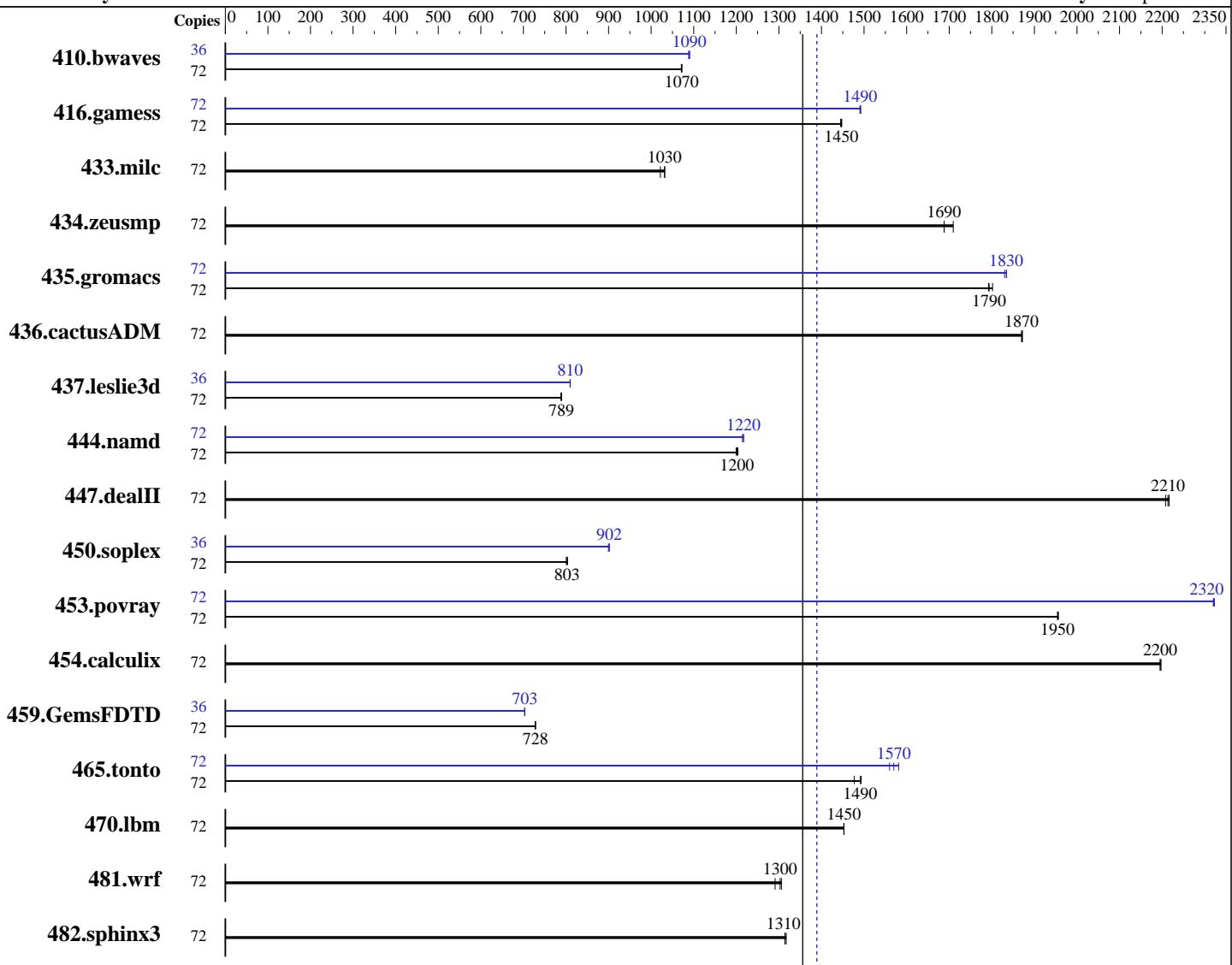
$SPECfp\_rate\_base2006 =$ 1360

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L3 Cache:	24.75 MB I+D on chip per chip
Other Cache:	None
Memory:	384 GB (24 x 16 GB 2Rx8 PC4-2666V-R)
Disk Subsystem:	1 x 480 GB SATA SSD
Other Hardware:	None

System State:	Run level 3 (multi-user)
Base Pointers:	32/64-bit
Peak Pointers:	32/64-bit
Other Software:	None

Results Table

Benchmark	Base Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Peak Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	72	914	1070	913	1070	**913**	**1070**	36	449	1090	450	1090	**449**	**1090**
416.gamess	72	976	1440	**974**	**1450**	974	1450	72	945	1490	946	1490	**946**	**1490**
433.milc	72	647	1020	**641**	**1030**	640	1030	72	647	1020	**641**	**1030**	640	1030
434.zeusmp	72	**388**	**1690**	383	1710	388	1690	72	**388**	**1690**	383	1710	388	1690
435.gromacs	72	285	1800	**287**	**1790**	287	1790	72	280	1830	**280**	**1830**	281	1830
436.cactusADM	72	**460**	**1870**	460	1870	460	1870	72	**460**	**1870**	460	1870	460	1870
437.leslie3d	72	**858**	**789**	859	788	857	790	36	**418**	**810**	418	809	418	810
444.namd	72	481	1200	**480**	**1200**	480	1200	72	474	1220	475	1210	**475**	**1220**
447.dealII	72	**372**	**2210**	372	2220	373	2210	72	**372**	**2210**	372	2220	373	2210
450.soplex	72	750	801	747	804	**748**	**803**	36	333	902	334	900	**333**	**902**
453.povray	72	**196**	**1950**	196	1960	196	1950	72	165	2320	165	2320	**165**	**2320**
454.calculix	72	271	2200	270	2200	**271**	**2200**	72	271	2200	270	2200	**271**	**2200**
459.GemsFDTD	72	**1049**	**728**	1049	728	1049	728	36	**543**	**703**	543	704	544	703
465.tonto	72	480	1480	**475**	**1490**	474	1490	72	454	1560	**451**	**1570**	448	1580
470.lbm	72	681	1450	**681**	**1450**	681	1450	72	681	1450	**681**	**1450**	681	1450
481.wrf	72	623	1290	616	1310	**617**	**1300**	72	623	1290	616	1310	**617**	**1300**
482.sphinx3	72	**1068**	**1310**	1068	1310	1065	1320	72	**1068**	**1310**	1068	1310	1065	1320

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 configuration:
 Set Power Efficiency Mode to Performance
 Set SNC to Enable

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Platform Notes (Continued)

```
Set IMC Interleaving to 1 way
Set Patrol Scrub to Disable
Set C1E to Disable
Sysinfo program /home/spec/config/sysinfo.rev6993
Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
running on localhost.localdomain Mon Aug 14 07:10:54 2017

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 6140 CPU @ 2.30GHz
      2 "physical id"s (chips)
      72 "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 : 18
      siblings  : 36
      physical 0: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 1: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
   cache size : 25344 KB

From /proc/meminfo
   MemTotal:       394654108 kB
   HugePages_Total:        0
   Hugepagesize:        2048 kB

From /etc/*release* /etc/*version*
   os-release:
      NAME="Red Hat Enterprise Linux Server"
      VERSION="7.3 (Maipo)"
      ID="rhel"
      ID_LIKE="fedora"
      VERSION_ID="7.3"
      PRETTY_NAME="Red Hat Enterprise Linux Server 7.3 (Maipo)"
      ANSI_COLOR="0;31"
      CPE_NAME="cpe:/o:redhat:enterprise_linux:7.3:GA:server"
   redhat-release: Red Hat Enterprise Linux Server release 7.3 (Maipo)
   system-release: Red Hat Enterprise Linux Server release 7.3 (Maipo)
   system-release-cpe: cpe:/o:redhat:enterprise_linux:7.3:ga:server

uname -a:
   Linux localhost.localdomain 3.10.0-514.26.2.el7.x86_64 #1 SMP Tue Jul 4
   15:04:05 UTC 2017 x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Aug 14 07:07

SPEC is set to: /home/spec
   Filesystem      Type   Size   Used Avail Use% Mounted on
   /dev/sda3       xfs    439G    42G  398G  10% /
```
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H3C

H3C UniServer R4900 G3 (Intel Xeon Gold 6140)

SPECfp_rate2006 =   1390

SPECfp_rate_base2006 = 1360

CPU2006 license: 9066
Test sponsor: H3C
Tested by: H3C

Test date: Aug-2017
Hardware Availability: Jul-2017
Software Availability: Sep-2016

Platform Notes (Continued)

```
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 American Megatrends Inc. 1.00.17 08/01/2017
  Memory:
  24x Micron 18ASF2G72PDZ-2G6D1 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/spec/libs/32:/home/spec/libs/64:/home/spec/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:
 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 -m64

C++ benchmarks:
     icpc -m64

Fortran benchmarks:
     ifort -m64

Benchmarks using both Fortran and C:
     icc -m64 ifort -m64

Base Portability Flags

    410.bwaves: -DSPEC_CPU_LP64
    416.gamess: -DSPEC_CPU_LP64
      433.milc: -DSPEC_CPU_LP64
    434.zeusmp: -DSPEC_CPU_LP64

SPEC CFP2006 Result
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H3C

H3C UniServer R4900 G3 (Intel Xeon Gold 6140)

SPECfp_rate2006 = 1390

SPECfp_rate_base2006 = 1360

CPU2006 license: 9066
Test sponsor: H3C
Tested by: H3C

Test date: Aug-2017
Hardware Availability: Jul-2017
Software Availability: Sep-2016

Base Portability Flags (Continued)

```
    435.gromacs: -DSPEC_CPU_LP64 -nofor_main
  436.cactusADM: -DSPEC_CPU_LP64 -nofor_main
    437.leslie3d: -DSPEC_CPU_LP64
      444.namd: -DSPEC_CPU_LP64
      447.dealII: -DSPEC_CPU_LP64
     450.soplex: -DSPEC_CPU_LP64
     453.povray: -DSPEC_CPU_LP64
    454.calculix: -DSPEC_CPU_LP64 -nofor_main
   459.GemsFDTD: -DSPEC_CPU_LP64
      465.tonto: -DSPEC_CPU_LP64
      470.lbm: -DSPEC_CPU_LP64
       481.wrf: -DSPEC_CPU_LP64 -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LINUX
    482.sphinx3: -DSPEC_CPU_LP64
```

Base Optimization Flags

C benchmarks:
```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -auto-p32
-qopt-mem-layout-trans=3
```

C++ benchmarks:
```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -auto-p32
-qopt-mem-layout-trans=3
```

Fortran benchmarks:
```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
```

Benchmarks using both Fortran and C:
```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -auto-p32
-qopt-mem-layout-trans=3
```

Peak Compiler Invocation

C benchmarks:
```
icc -m64
```

C++ benchmarks (except as noted below):
```
icpc -m64
```

```
  450.soplex: icpc -m32 -L/opt/intel/compilers_and_libraries_2017/linux/lib/ia32
```

Fortran benchmarks:
```
ifort -m64
```

Benchmarks using both Fortran and C:
```
icc -m64 ifort -m64
```

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$SPECfp\_rate2006 =$ 1390

$SPECfp\_rate\_base2006 =$ 1360

CPU2006 license: 9066
Test sponsor: H3C
Tested by: H3C

Test date: Aug-2017
Hardware Availability: Jul-2017
Software Availability: Sep-2016

Peak Portability Flags

```
   410.bwaves: -DSPEC_CPU_LP64
   416.gamess: -DSPEC_CPU_LP64
     433.milc: -DSPEC_CPU_LP64
   434.zeusmp: -DSPEC_CPU_LP64
  435.gromacs: -DSPEC_CPU_LP64 -nofor_main
436.cactusADM: -DSPEC_CPU_LP64 -nofor_main
  437.leslie3d: -DSPEC_CPU_LP64
    444.namd: -DSPEC_CPU_LP64
    447.dealII: -DSPEC_CPU_LP64
   450.soplex: -D_FILE_OFFSET_BITS=64
   453.povray: -DSPEC_CPU_LP64
  454.calculix: -DSPEC_CPU_LP64 -nofor_main
  459.GemsFDTD: -DSPEC_CPU_LP64
    465.tonto: -DSPEC_CPU_LP64
     470.lbm: -DSPEC_CPU_LP64
      481.wrf: -DSPEC_CPU_LP64 -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LINUX
  482.sphinx3: -DSPEC_CPU_LP64
```

Peak Optimization Flags

C benchmarks:

```
    433.milc: basepeak = yes

     470.lbm: basepeak = yes

  482.sphinx3: basepeak = yes
```

C++ benchmarks:

```
   444.namd: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
             -par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
             -no-prec-div(pass 2) -fno-alias -auto-ilp32
             -qopt-mem-layout-trans=3

   447.dealII: basepeak = yes

   450.soplex: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
             -par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
             -no-prec-div(pass 2) -qopt-malloc-options=3
             -qopt-mem-layout-trans=3

   453.povray: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
             -par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
             -no-prec-div(pass 2) -unroll4 -qopt-mem-layout-trans=3
```

Fortran benchmarks:

H3C

H3C UniServer R4900 G3 (Intel Xeon Gold 6140)

$SPECfp\_rate2006 =$ 1390

$SPECfp\_rate\_base2006 =$ 1360

CPU2006 license: 9066	**Test date:** Aug-2017
Test sponsor: H3C	**Hardware Availability:** Jul-2017
Tested by: H3C	**Software Availability:** Sep-2016

Peak Optimization Flags (Continued)

410.bwaves: `-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch`

416.gamess: `-prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)`
`-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)`
`-no-prec-div(pass 2) -unroll2 -inline-level=0 -scalar-rep-`

434.zeusmp: basepeak = yes

437.leslie3d: `Same as 410.bwaves`

459.GemsFDTD: `Same as 410.bwaves`

465.tonto: `-prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)`
`-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)`
`-no-prec-div(pass 2) -unroll4 -auto -inline-calloc`
`-qopt-malloc-options=3`

Benchmarks using both Fortran and C:

435.gromacs: `-prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)`
`-par-num-threads=1(pass 1) -qopt-prefetch -auto-ilp32`
`-qopt-mem-layout-trans=3`

436.cactusADM: basepeak = yes

454.calculix: basepeak = yes

481.wrf: basepeak = yes

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/H3C-Platform-Settings-SKL-V1.1.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/H3C-Platform-Settings-SKL-V1.1.xml

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

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