SPEC® CFP2006 Result
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Huawei

Huawei BH640 V2 (Intel Xeon E5-4620)

$SPECfp^®\_rate2006 = \quad 543$

$SPECfp\_rate\_base2006 = \quad 529$

CPU2006 license: 3175
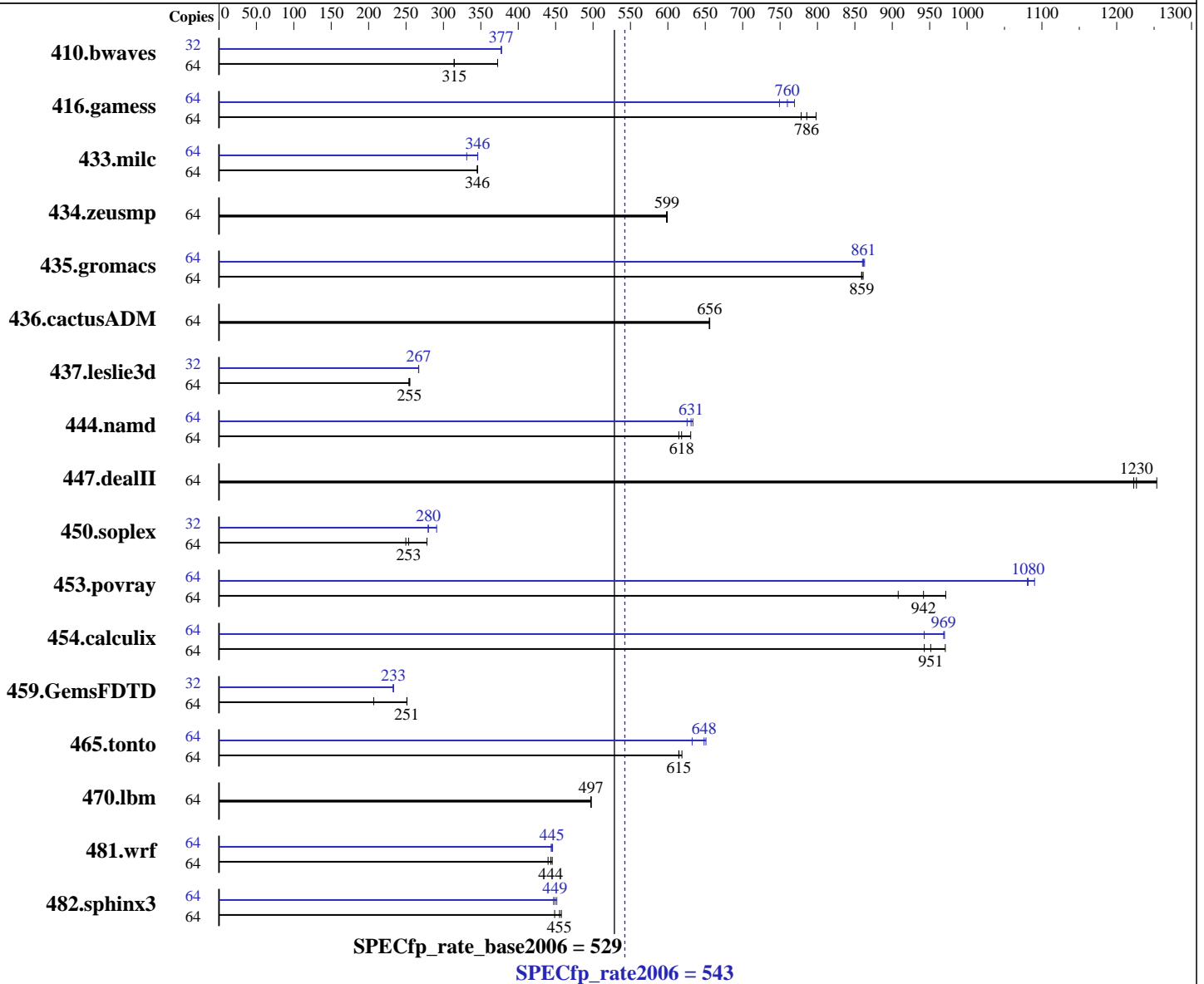**Test sponsor:** Huawei
Tested by: Huawei

Test date: Dec-2012
Hardware Availability: May-2012
Software Availability: Oct-2012

SPECfp_rate_base2006 = 529

SPECfp_rate2006 = 543

Hardware

CPU Name:	Intel Xeon E5-4620
CPU Characteristics:	Intel Turbo Boost Technology up to 2.60 GHz
CPU MHz:	2200
FPU:	Integrated
CPU(s) enabled:	32 cores, 4 chips, 8 cores/chip, 2 threads/core
CPU(s) orderable:	2,4 chips
Primary Cache:	32 KB I + 32 KB D on chip per core
Secondary Cache:	256 KB I+D on chip per core

Continued on next page

Software

Operating System:	Red Hat Enterprise Linux Server release 6.2 (Santiago) 2.6.32-220.el6.x86_64
Compiler:	C/C++: Version 13.0.0.079 of Intel C++ Studio XE for Linux; Fortran: Version 13.0.0.079 of Intel Fortran Studio XE for Linux
Auto Parallel:	No
File System:	ext4

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L3 Cache:	16 MB I+D on chip per chip	System State:	Run level 3 (multi-user)
Other Cache:	None	Base Pointers:	32/64-bit
Memory:	128 GB (16 x 8 GB 2Rx4 PC3-10600R-9, ECC)	Peak Pointers:	32/64-bit
Disk Subsystem:	1 x 300 GB SAS, 10K RPM	Other Software:	None
Other Hardware:	None		

Results Table

Benchmark	Base						Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	64	2335	372	**2765**	**315**	2768	314	32	1152	378	1152	377	**1152**	**377**
416.gamess	64	**1595**	**786**	1570	798	1610	778	64	**1649**	**760**	1673	749	1629	769
433.milc	64	1702	345	1700	346	**1700**	**346**	64	**1699**	**346**	1699	346	1774	331
434.zeusmp	64	974	598	**973**	**599**	972	599	64	974	598	**973**	**599**	972	599
435.gromacs	64	**532**	**859**	532	859	531	861	64	531	860	**530**	**861**	530	863
436.cactusADM	64	**1166**	**656**	1167	655	1166	656	64	**1166**	**656**	1167	655	1166	656
437.leslie3d	64	**2361**	**255**	2358	255	2370	254	32	1126	267	**1127**	**267**	1127	267
444.namd	64	**830**	**618**	835	615	814	631	64	820	626	810	634	**813**	**631**
447.dealII	64	**597**	**1230**	584	1250	599	1220	64	**597**	**1230**	584	1250	599	1220
450.soplex	64	**2106**	**253**	2137	250	1920	278	32	**953**	**280**	917	291	955	280
453.povray	64	**362**	**942**	375	908	350	971	64	315	1080	**315**	**1080**	312	1090
454.calculix	64	**555**	**951**	544	971	560	943	64	**545**	**969**	560	943	544	970
459.GemsFDTD	64	3283	207	**2705**	**251**	2702	251	32	1456	233	**1457**	**233**	1458	233
465.tonto	64	**1024**	**615**	1025	615	1018	619	64	967	651	996	632	**971**	**648**
470.lbm	64	**1768**	**497**	1768	497	1769	497	64	**1768**	**497**	1768	497	1769	497
481.wrf	64	1625	440	1605	445	**1612**	**444**	64	1603	446	1610	444	**1606**	**445**
482.sphinx3	64	2780	449	**2740**	**455**	2726	458	64	2762	452	2789	447	**2776**	**449**

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/redhat_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>
Select only test related files when installing the operating system

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Platform Notes

```
BIOS configuration:
Set Power Efficiency Mode to Performance
Baseboard Management Controller used to adjust the fan speed to 100%
Sysinfo program /spec/config/sysinfo.rev6800
$Rev: 6800 $ $Date:: 2011-10-11 #$ 6f2ebdff5032aaa42e583f96b07f99d3
running on localhost.localdomain Mon May 10 01:44:02 2010

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 E5-4620 0 @ 2.20GHz
      4 "physical id"s (chips)
      64 "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  : 16
      physical 0: cores 0 1 2 3 4 5 6 7
      physical 1: cores 0 1 2 3 4 5 6 7
      physical 2: cores 0 1 2 3 4 5 6 7
      physical 3: cores 0 1 2 3 4 5 6 7
   cache size : 16384 KB

From /proc/meminfo
   MemTotal:       132117380 kB
   HugePages_Total:        0
   Hugepagesize:        2048 kB

/usr/bin/lsb_release -d
   Red Hat Enterprise Linux Server release 6.3 (Santiago)

From /etc/*release* /etc/*version*
   redhat-release: Red Hat Enterprise Linux Server release 6.3 (Santiago)
   system-release: Red Hat Enterprise Linux Server release 6.3 (Santiago)
   system-release-cpe: cpe:/o:redhat:enterprise_linux:6server:ga:server

uname -a:
   Linux localhost.localdomain 2.6.32-279.el6.x86_64 #1 SMP Wed Jun 13 18:24:36
   EDT 2012 x86_64 x86_64 x86_64 GNU/Linux

run-level 3 May 9 06:55

SPEC is set to: /spec
   Filesystem     Type     Size   Used Avail Use% Mounted on
   /dev/sda2      ext3     272G    60G  198G  24% /

Additional information from dmidecode:

(End of data from sysinfo program)
```

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General Notes

```
Environment variables set by runspec before the start of the run:
LD_LIBRARY_PATH = "/spec/libs/32:/spec/libs/64"

 Binaries compiled on a system with 2 x Xeon X5645 CPU + 16GB memory
 using RHEL 6.1
```

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
   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:
```
-xAVX -ipo -O3 -no-prec-div -static -opt-prefetch -auto-p32
-ansi-alias -opt-mem-layout-trans=3
```

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Base Optimization Flags (Continued)

C++ benchmarks:
```
-xAVX -ipo -O3 -no-prec-div -static -opt-prefetch -auto-p32
-ansi-alias -opt-mem-layout-trans=3
```

Fortran benchmarks:
```
-xAVX -ipo -O3 -no-prec-div -static -opt-prefetch
```

Benchmarks using both Fortran and C:
```
-xAVX -ipo -O3 -no-prec-div -static -opt-prefetch -auto-p32
-ansi-alias -opt-mem-layout-trans=3
```

Peak Compiler Invocation

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

    482.sphinx3: `icc -m32`

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

     450.soplex: `icpc -m32`

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

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

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`
        453.povray: `-DSPEC_CPU_LP64`
        454.calculix: `-DSPEC_CPU_LP64 -nofor_main`
         465.tonto: `-DSPEC_CPU_LP64`
          470.lbm: `-DSPEC_CPU_LP64`
          481.wrf: `-DSPEC_CPU_LP64 -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LINUX`

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Peak Optimization Flags

C benchmarks:

> 433.milc: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
> -no-prec-div(pass 2) -prof-use(pass 2) -static -auto-ilp32
> -opt-mem-layout-trans=3

> 470.lbm: basepeak = yes

> 482.sphinx3: -xSSE4.2 -ipo -O3 -no-prec-div -opt-prefetch -static
> -unroll2

C++ benchmarks:

> 444.namd: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
> -no-prec-div(pass 2) -prof-use(pass 2) -fno-alias
> -auto-ilp32

> 447.dealII: basepeak = yes

> 450.soplex: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
> -no-prec-div(pass 2) -prof-use(pass 2) -opt-malloc-options=3

> 453.povray: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
> -no-prec-div(pass 2) -prof-use(pass 2) -auto-ilp32
> -opt-mem-layout-trans=3

Fortran benchmarks:

> 410.bwaves: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
> -no-prec-div(pass 2) -prof-use(pass 2) -static

> 416.gamess: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
> -no-prec-div(pass 2) -prof-use(pass 2) -unroll2
> -inline-level=0 -scalar-rep- -static

> 434.zeusmp: basepeak = yes

> 437.leslie3d: -xAVX -ipo -O3 -no-prec-div -static -opt-prefetch

> 459.GemsFDTD: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
> -no-prec-div(pass 2) -prof-use(pass 2) -opt-malloc-options=3

> 465.tonto: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
> -no-prec-div(pass 2) -prof-use(pass 2) -unroll4 -auto
> -inline-calloc -opt-malloc-options=3

Benchmarks using both Fortran and C:

> 435.gromacs: -xAVX(pass 2) -prof-gen(pass 1) -ipo -O3 -no-prec-div
> -prof-use(pass 2) -xSSE4.2 -opt-prefetch -static
> -auto-ilp32 -opt-mem-layout-trans=3

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Peak Optimization Flags (Continued)

436.cactusADM: basepeak = yes

454.calculix: -xAVX -ipo -O3 -no-prec-div -static -auto-ilp32
        -opt-mem-layout-trans=3

481.wrf: Same as 454.calculix

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2006/flags/Intel-ic12.1-official-linux64.20120425.html
http://www.spec.org/cpu2006/flags/Huawei-Platform-Settings-revE.20121120.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/Intel-ic12.1-official-linux64.20120425.xml
http://www.spec.org/cpu2006/flags/Huawei-Platform-Settings-revE.20121120.xml

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