SPEC® CFP2006 Result
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IBM Corporation
IBM System x3650 M5

$SPECfp^{®}\_rate2006 =$ 940

SPECfp_rate_base2006 = 913

CPU2006 license: 11
Test sponsor: IBM Corporation
Tested by: IBM Corporation

Test date: Sep-2014
Hardware Availability: Oct-2014
Software Availability: Nov-2013

Benchmark	Copies	Result
410.bwaves	72	632
416.gamess	72 / 72	1280 / 1210
433.milc	72 / 72	595 / 594
434.zeusmp	72	1030
435.gromacs	72 / 72	1450 / 1420
436.cactusADM	72	1190
437.leslie3d	36 / 72	466 / 450
444.namd	72 / 72	1050 / 1030
447.dealII	72	1730
450.soplex	36 / 72	564 / 461
453.povray	72 / 72	1870 / 1670
454.calculix	72	1770
459.GemsFDTD	72	433
465.tonto	72 / 72	1120 / 1060
470.lbm	72	867
481.wrf	72 / 72	754 / 749
482.sphinx3	72	823

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Hardware

CPU Name: Intel Xeon E5-2699 v3
CPU Characteristics: Intel Turbo Boost Technology up to 3.60 GHz
CPU MHz: 2300
FPU: Integrated
CPU(s) enabled: 36 cores, 2 chips, 18 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

Continued on next page

Software

Operating System: Red Hat Enterprise Linux Server release 6.5 (Santiago)
2.6.32-431.el6.x86_64
Compiler: C/C++: Version 15.0.0.090 of Intel C++ Studio XE for Linux;
Fortran: Version 15.0.0.090 of Intel Fortran Studio XE for Linux
Auto Parallel: No
File System: ext4

Continued on next page

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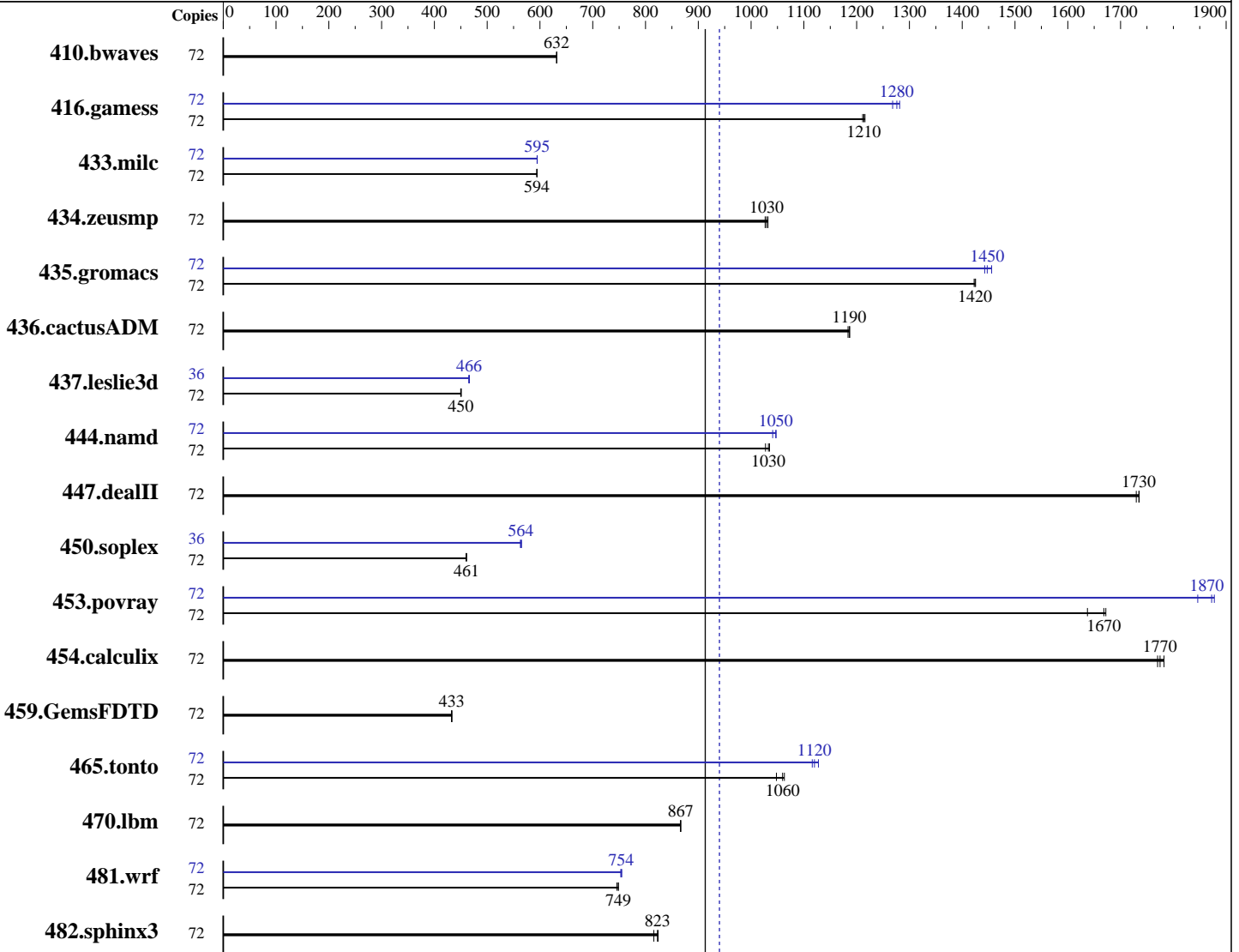SPECfp_rate_base2006 = 913

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L3 Cache:	45 MB I+D on chip per chip
Other Cache:	None
Memory:	256 GB (16 x 16 GB 2Rx4 PC4-2133P-R)
Disk Subsystem:	1 x 300 GB SAS
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						Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	72	**1549**	**632**	1548	632	1550	631	72	**1549**	**632**	1548	632	1550	631
416.gamess	72	1164	1210	1160	1220	**1162**	**1210**	72	**1105**	**1280**	1100	1280	1112	1270
433.milc	72	1113	594	**1112**	**594**	1112	594	72	1112	595	1111	595	**1111**	**595**
434.zeusmp	72	635	1030	**637**	**1030**	638	1030	72	635	1030	**637**	**1030**	638	1030
435.gromacs	72	**361**	**1420**	361	1430	361	1420	72	353	1460	**355**	**1450**	356	1440
436.cactusADM	72	725	1190	**725**	**1190**	727	1180	72	725	1190	**725**	**1190**	727	1180
437.leslie3d	72	1504	450	1501	451	**1503**	**450**	36	728	465	**726**	**466**	725	466
444.namd	72	558	1030	562	1030	**559**	**1030**	72	555	1040	551	1050	**552**	**1050**
447.dealII	72	476	1730	475	1740	**475**	**1730**	72	476	1730	475	1740	**475**	**1730**
450.soplex	72	1303	461	1306	460	**1303**	**461**	36	533	563	**532**	**564**	531	565
453.povray	72	234	1640	229	1670	**230**	**1670**	72	204	1880	207	1850	**205**	**1870**
454.calculix	72	333	1780	**335**	**1770**	336	1770	72	333	1780	**335**	**1770**	336	1770
459.GemsFDTD	72	1763	433	1766	433	**1766**	**433**	72	1763	433	1766	433	**1766**	**433**
465.tonto	72	**669**	**1060**	666	1060	676	1050	72	635	1120	628	1130	**633**	**1120**
470.lbm	72	1141	867	**1142**	**867**	1142	866	72	1141	867	**1142**	**867**	1142	866
481.wrf	72	1074	749	**1074**	**749**	1079	746	72	1065	755	**1067**	**754**	1068	753
482.sphinx3	72	**1706**	**823**	1720	816	1703	824	72	**1706**	**823**	1720	816	1703	824

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

Sysinfo program /root/SPECCpu2014Sep01/config/sysinfo.rev6818
$Rev: 6818 $ $Date:: 2012-07-17 #$ e86d102572650a6e4d596a3cee98f191
running on localhost.localdomain Mon Sep 1 17:01:25 2014

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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) CPU E5-2699 v3 @ 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 : 23040 KB

   From /proc/meminfo
      MemTotal:       264150104 kB
      HugePages_Total:        0
      Hugepagesize:        2048 kB

   /usr/bin/lsb_release -d
      Red Hat Enterprise Linux Server release 6.5 (Santiago)

   From /etc/*release* /etc/*version*
      redhat-release: Red Hat Enterprise Linux Server release 6.5 (Santiago)
      system-release: Red Hat Enterprise Linux Server release 6.5 (Santiago)
      system-release-cpe: cpe:/o:redhat:enterprise_linux:6server:ga:server

   uname -a:
      Linux localhost.localdomain 2.6.32-431.el6.x86_64 #1 SMP Sun Nov 10 22:19:54
      EST 2013 x86_64 x86_64 x86_64 GNU/Linux

   run-level 3 Sep 1 14:15

   SPEC is set to: /root/SPECCpu2014Sep01
      Filesystem                     Type  Size  Used Avail Use% Mounted on
      /dev/mapper/VolGroup-lv_root ext4  271G   28G  230G  11% /

   Additional information from dmidecode:
     BIOS IBM -[TCE101Y-1.00]- 08/22/2014
     Memory:
     1x Hynix 4180418041804180418041804180418041804180 256 MB 2133 MHz 1 rank
     1x Hynix 418C418C418C418C418C418C418C418C418C   2133 MHz 2 rank
     9x Hynix 484D41343247523748466322344E2D54465431 16 GB 2133 MHz 2 rank
     1x Hynix 484D41343247523748466322344E2D54465446   2133 MHz 1 rank
     1x NO DIMM 4182418241824182418241824182418241824182 256 MB 2133 MHz 1 rank
     11x NO DIMM Unknown

   (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 = "/root/SPECCpu2014Sep01/libs/32:/root/SPECCpu2014Sep01/libs/64:/root/SPECCpu2014Sep01/sh"

 Binaries compiled on a system with 1x Core i7-860 CPU + 8GB
memory using RedHat EL 6.4
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>

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

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Base Optimization Flags

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

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

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

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

Peak Compiler Invocation

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

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
  459.GemsFDTD: -DSPEC_CPU_LP64
```

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Peak Portability Flags (Continued)

```
   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: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)
            -O3(pass 2) -no-prec-div(pass 2)
            -opt-mem-layout-trans=3(pass 2) -prof-use(pass 2)
            -auto-ilp32
```

```
    470.lbm: basepeak = yes
```

```
 482.sphinx3: basepeak = yes
```

C++ benchmarks:

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

```
  447.dealII: basepeak = yes
```

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

```
   453.povray: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)
            -O3(pass 2) -no-prec-div(pass 2)
            -opt-mem-layout-trans=3(pass 2) -prof-use(pass 2) -unroll4
            -ansi-alias
```

Fortran benchmarks:

```
  410.bwaves: basepeak = yes
```

```
  416.gamess: -xCORE-AVX2(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-
```

```
  434.zeusmp: basepeak = yes
```

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Tested by:	IBM Corporation	**Software Availability:**	Nov-2013

Peak Optimization Flags (Continued)

437.leslie3d: -xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch

459.GemsFDTD: basepeak = yes

465.tonto: -xCORE-AVX2(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: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)
-O3(pass 2) -no-prec-div(pass 2)
-opt-mem-layout-trans=3(pass 2) -prof-use(pass 2)
-opt-prefetch -auto-ilp32

436.cactusADM: basepeak = yes

454.calculix: basepeak = yes

481.wrf: -xCORE-AVX2 -ipo -O3 -no-prec-div -auto-ilp32

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2006/flags/Intel-ic14.0-official-linux64.20140128.html
http://www.spec.org/cpu2006/flags/IBM-Platform-Flags-V1.2-HSW-B.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/Intel-ic14.0-official-linux64.20140128.xml
http://www.spec.org/cpu2006/flags/IBM-Platform-Flags-V1.2-HSW-B.xml

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

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