SPEC® CFP2006 Result

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IBM Corporation

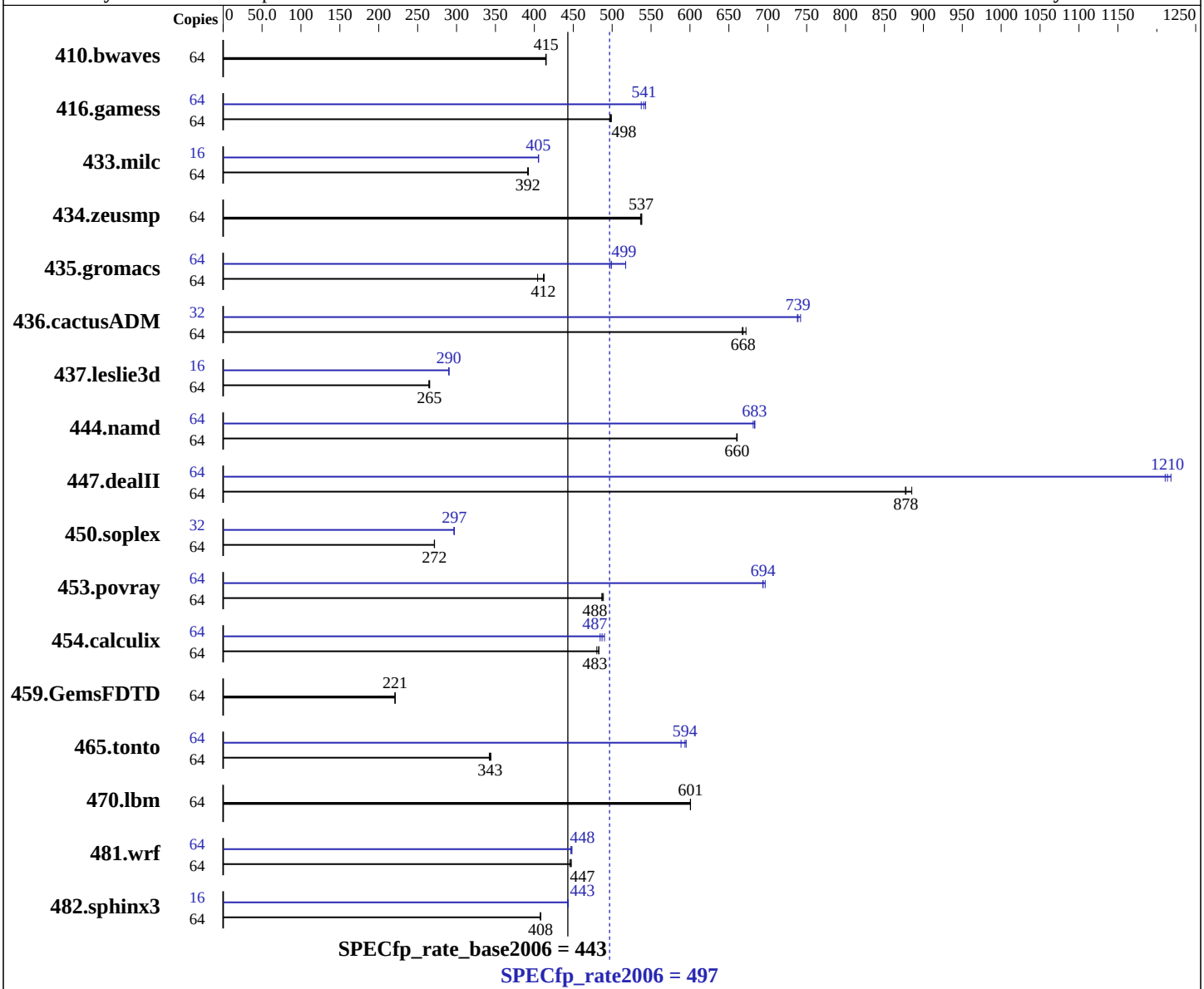
IBM Power 740 Express (3.55 GHz, 16 core, RedHat)

SPECfp®_rate2006 = 497

SPECfp_rate_base2006 = 443

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

Test date: Oct-2010
Hardware Availability: Sep-2010
Software Availability: Nov-2010



Hardware

CPU Name:	POWER7
CPU Characteristics:	Intelligent Energy Optimization enabled, up to 3.86 GHz
CPU MHz:	3556
FPU:	Integrated
CPU(s) enabled:	16 cores, 2 chips, 8 cores/chip, 4 threads/core
CPU(s) orderable:	8,16 cores
Primary Cache:	32 KB I + 32 KB D on chip per core

Continued on next page

Software

Operating System:	Red Hat Enterprise Linux Server release 6.0 (ppc64), Kernel 2.6.32-71.el6.ppc64
Compiler:	IBM XL C/C++ for Linux, V11.1 Updated with the Nov2010 PTF IBM XL Fortran for Linux, V13.1 Updated with the Nov2010 PTF
Auto Parallel:	No
File System:	ext3
System State:	Run Level 3 (multi-user)

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Secondary Cache: 256 KB I+D on chip per core
L3 Cache: 4 MB I+D on chip per core
Other Cache: None
Memory: 256 GB (32x8 GB) DDR3 1066 MHz
Disk Subsystem: 1x146.8 GB SAS SFF 15K RPM
Other Hardware: None

Base Pointers: 32-bit
Peak Pointers: 32/64-bit
Other Software: -Post-Link Optimization for Linux on POWER, Version 5.5.0-3
-MicroQuill SmartHeap 9
-Apache C++ Standard Library 4.2.1

Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	64	**2096**	**415**	2098	415	2095	415	64	**2096**	**415**	2098	415	2095	415
416.gamess	64	**2515**	**498**	2522	497	2511	499	64	2308	543	**2317**	**541**	2332	537
433.milc	64	1501	391	1497	392	**1500**	**392**	16	**362**	**405**	363	405	362	405
434.zeusmp	64	1086	537	**1084**	**537**	1082	538	64	1086	537	**1084**	**537**	1082	538
435.gromacs	64	1108	413	**1110**	**412**	1131	404	64	**915**	**499**	919	497	883	517
436.cactusADM	64	**1144**	**668**	1146	667	1138	672	32	515	742	**518**	**739**	518	738
437.leslie3d	64	**2268**	**265**	2266	265	2276	264	16	518	290	**518**	**290**	518	290
444.namd	64	**777**	**660**	777	661	778	660	64	751	684	**751**	**683**	753	681
447.dealII	64	827	885	835	877	**834**	**878**	64	**603**	**1210**	601	1220	605	1210
450.soplex	64	1964	272	1967	271	**1966**	**272**	32	900	296	898	297	**898**	**297**
453.povray	64	697	489	**698**	**488**	700	487	64	**491**	**694**	489	697	491	694
454.calculix	64	**1094**	**483**	1094	483	1099	480	64	1077	490	**1084**	**487**	1090	485
459.GemsFDTD	64	**3074**	**221**	3069	221	3075	221	64	**3074**	**221**	3069	221	3075	221
465.tonto	64	1830	344	1841	342	**1835**	**343**	64	1058	595	**1061**	**594**	1070	589
470.lbm	64	1464	601	1464	601	**1464**	**601**	64	1464	601	1464	601	**1464**	**601**
481.wrf	64	1597	448	1604	446	**1601**	**447**	64	1594	448	**1597**	**448**	1600	447
482.sphinx3	64	**3058**	**408**	3059	408	3056	408	16	703	444	**704**	**443**	704	443

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Peak Tuning Notes

```
IBM Post-Link Optimization tool with
options "-O4 -nodp" used for
  433.milc 435.gromacs 450.soplex 482.sphinx3
options "-O4 -vrox -nodp" used for
  434.zeusmp
options "-O3 -lu -1 -nodp -sdp 9"  used for
  437.leslie3d 444.namd
options "-O4"  used for
  465.tonto
```

Submit Notes

```
The config file option 'submit' was used.
 Benchmarks bound to a processor using numactl on the submit command.
```

Operating System Notes

```
ulimit -s (stack) set to 1048576.
Large pages reserved as follows by root user:
  echo 4224 > /proc/sys/vm/nr_hugepages
The following environment varibles were set before the runspec command:
  XLFRTEOPTS=intrinthds=1
  HUGETLB_VERBOSE=0
  HUGETLB_MORECORE=yes
  HUGETLB_ELFMAP=RW
447.dealII (peak): "apache_stdcxx_4_2_1" src.alt was used.
447.dealII (base): "apache_stdcxx_4_2_1" src.alt was used.
```

Base Compiler Invocation

C benchmarks:
```
xlc -qlanglvl=extc99
```

C++ benchmarks:
```
xlC
```

Fortran benchmarks:
```
xlf95
```

Benchmarks using both Fortran and C:
```
xlc -qlanglvl=extc99 xlf95
```

Base Portability Flags

410.bwaves: `-qfixed`
416.gamess: `-qfixed`
434.zeusmp: `-qfixed`
435.gromacs: `-qfixed -qextname`
436.cactusADM: `-qfixed -qextname`
437.leslie3d: `-qfixed`
454.calculix: `-qfixed -qextname`
481.wrf: `-DNOUNDERSCORE`
482.sphinx3: `-qchars=signed`

Base Optimization Flags

C benchmarks:
```
-O5 -qarch=pwr7 -qtune=pwr7 -B/usr/share/libhugetlbfs/ -tl
-Wl,--hugetlbfs-align
```

C++ benchmarks:
```
-O5 -qarch=pwr7 -qtune=pwr7 -qrtti -B/usr/share/libhugetlbfs/ -tl
-Wl,--hugetlbfs-align
```

Fortran benchmarks:
```
-O5 -qarch=pwr7 -qtune=pwr7 -qsmallstack=dynlenonheap -qalias=nostd
-B/usr/share/libhugetlbfs/ -tl -Wl,--hugetlbfs-align
```

Benchmarks using both Fortran and C:
```
-O5 -qarch=pwr7 -qtune=pwr7 -B/usr/share/libhugetlbfs/ -tl
-Wl,--hugetlbfs-align -qsmallstack=dynlenonheap -qalias=nostd
```

Base Other Flags

C benchmarks:
```
-qipa=threads
```

C++ benchmarks:
```
-qipa=threads
```

Fortran benchmarks:
```
-qipa=threads
```

Benchmarks using both Fortran and C:
```
-qipa=threads
```

Peak Compiler Invocation

C benchmarks:
```
xlc -qlanglvl=extc99
```

C++ benchmarks:
```
xlC
```

Fortran benchmarks:
```
xlf95
```

Benchmarks using both Fortran and C:
```
xlc -qlanglvl=extc99 xlf95
```

Peak Portability Flags

410.bwaves: -qfixed
416.gamess: -qfixed
434.zeusmp: -qfixed
435.gromacs: -qfixed -qextname
436.cactusADM: -DSPEC_CPU_LP64 -qfixed -qextname
437.leslie3d: -qfixed
453.povray: -DSPEC_CPU_LP64
454.calculix: -qfixed -qextname
481.wrf: -DNOUNDERSCORE
482.sphinx3: -qchars=signed

Peak Optimization Flags

C benchmarks:

433.milc: -Wl,-q -O5 -qarch=pwr7 -qtune=pwr7 -lhugetlbfs

470.lbm: basepeak = yes

482.sphinx3: -Wl,-q -qpdf1(pass 1) -qpdf2(pass 2) -O4 -qarch=pwr7
-qtune=pwr7 -lhugetlbfs

C++ benchmarks:

444.namd: -Wl,-q -qpdf1(pass 1) -qpdf2(pass 2) -O5 -qarch=pwr7
-qtune=pwr7 -lhugetlbfs

447.dealII: -O4 -qarch=pwr7 -qtune=pwr7 -qrtti
-qcpp_stdinc=/autobench/sources/stdcxx-4.2.1/dist/include/ansi:/autobench/sources/stdcxx-4.2.1/dist/include:/opt/ibmcmp/vacpp/11.1/incl
-lsmartheap -L/autobench/sources/stdcxx-4.2.1/dist/lib
-R/autobench/sources/stdcxx-4.2.1/dist/lib -lstd8d

450.soplex: -Wl,-q -qpdf1(pass 1) -qpdf2(pass 2) -O3 -qarch=pwr7
-qtune=pwr7 -q64 -lhugetlbfs

453.povray: -Wl,-q -qpdf1(pass 1) -qpdf2(pass 2) -O4 -qarch=pwr7
-qtune=pwr7 -qsimd -q64 -lsmartheap64

Fortran benchmarks:

410.bwaves: basepeak = yes

416.gamess: -qpdf1(pass 1) -qpdf2(pass 2) -O5 -qarch=pwr7 -qtune=pwr7
-qalias=nostd -lhugetlbfs

434.zeusmp: basepeak = yes

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Peak Optimization Flags (Continued)

437.leslie3d: `-Wl,-q -O5 -qarch=pwr7 -qtune=pwr7 -q64 -B/usr/share/libhugetlbfs/ -tl -Wl,--hugetlbfs-align`

459.GemsFDTD: `basepeak = yes`

465.tonto: `-Wl,-q -qpdf1`(pass 1) `-qpdf2`(pass 2) `-O5 -qarch=pwr7 -qtune=pwr7 -qsimd -lhugetlbfs`

Benchmarks using both Fortran and C:

435.gromacs: `-Wl,-q -qpdf1`(pass 1) `-qpdf2`(pass 2) `-O4 -qarch=pwr7 -qtune=pwr7 -qsimd -lhugetlbfs`

436.cactusADM: `-O4 -qarch=pwr7 -qtune=pwr7 -qsimd -qnostrict -q64 -lhugetlbfs`

454.calculix: `-qpdf1`(pass 1) `-qpdf2`(pass 2) `-O5 -qarch=pwr7 -qtune=pwr7 -B/usr/share/libhugetlbfs/ -tl -Wl,--hugetlbfs-align`

481.wrf: `-O3 -qarch=pwr7 -qtune=pwr7 -q64 -lhugetlbfs`

Peak Other Flags

C benchmarks:
`-qipa=threads`

C++ benchmarks (except as noted below):
`-qipa=threads`

Fortran benchmarks:
`-qipa=threads`

Benchmarks using both Fortran and C (except as noted below):
`-qipa=threads`

The flags file that was used to format this result can be browsed at
`http://www.spec.org/cpu2006/flags/IBM-Linux-XL.20101123.01.html`

You can also download the XML flags source by saving the following link:
`http://www.spec.org/cpu2006/flags/IBM-Linux-XL.20101123.01.xml`

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