



SPEC® CINT2006 Result

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IBM Corporation

SPECint®_rate2006 = 580

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

SPECint_rate_base2006 = 516

CPU2006 license: 11

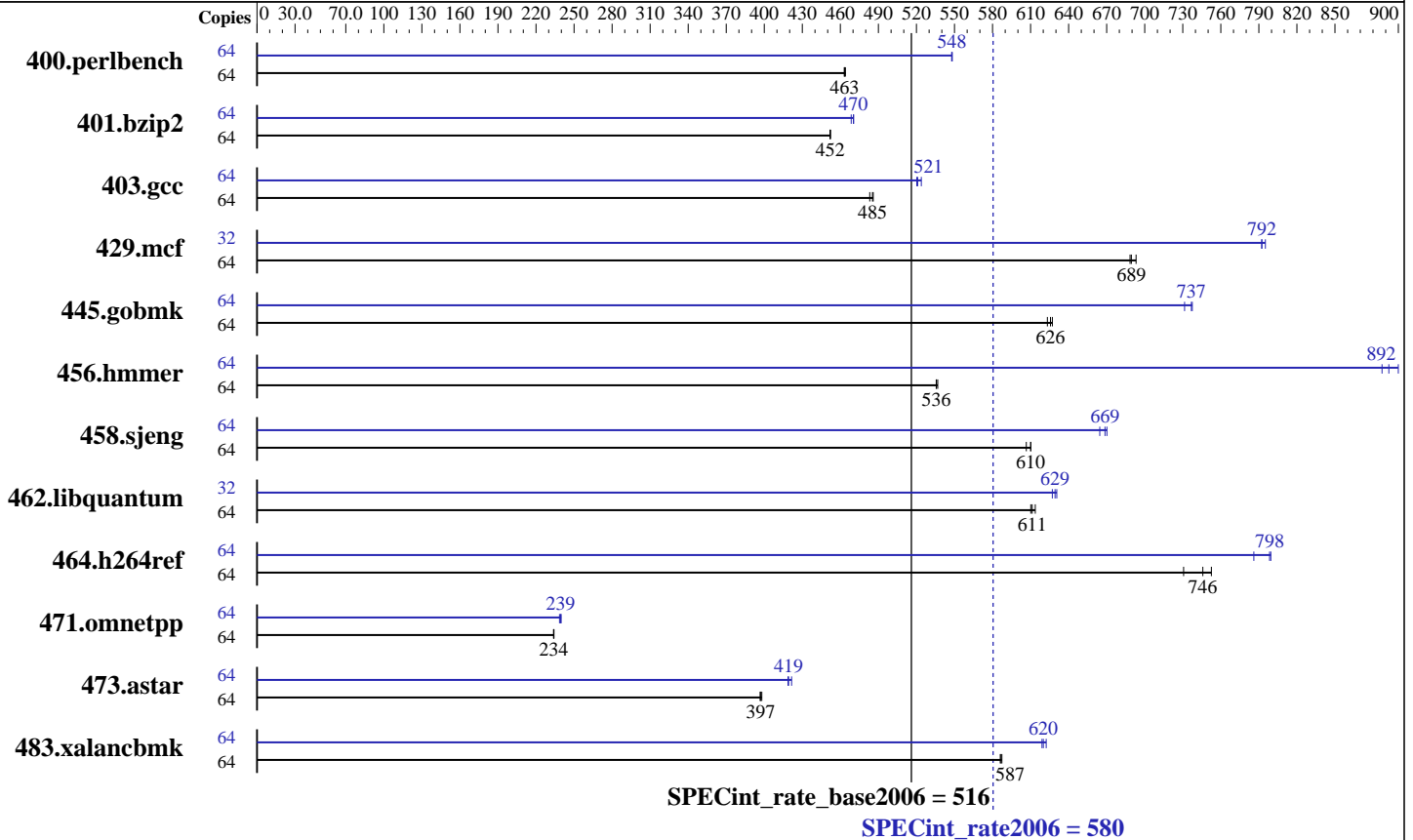
Test date: Jul-2010

Test sponsor: IBM Corporation

Hardware Availability: Sep-2010

Tested by: IBM Corporation

Software Availability: Aug-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: 16 cores
 Primary Cache: 32 KB I + 32 KB D on chip per core
 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: 2x146.8 GB SAS SFF 15K RPM
 Other Hardware: None

Software

Operating System: SUSE Linux Enterprise Server 11 SP1 (ppc64), Kernel 2.6.32.12-0.7-ppc64
 Compiler: IBM XL C/C++ for Linux, V11.1
 Auto Parallel: No
 File System: ext3
 System State: Run level 3 (multi-user)
 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



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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 | 64 | 1350 | 463 | 1348 | 464 | <u>1350</u> | <u>463</u> | 64 | 1140 | 548 | 1141 | 548 | <u>1141</u> | <u>548</u> |
| 401.bzip2 | 64 | 1367 | 452 | <u>1366</u> | <u>452</u> | 1366 | 452 | 64 | <u>1313</u> | <u>470</u> | 1318 | 469 | 1313 | 470 |
| 403.gcc | 64 | 1060 | 486 | 1066 | 483 | <u>1062</u> | <u>485</u> | 64 | 984 | 524 | <u>989</u> | <u>521</u> | 990 | 520 |
| 429.mcf | 64 | 842 | 693 | 848 | 688 | <u>847</u> | <u>689</u> | 32 | 367 | 795 | 368 | 792 | <u>368</u> | <u>792</u> |
| 445.gobmk | 64 | <u>1073</u> | <u>626</u> | 1070 | 627 | 1077 | 623 | 64 | <u>911</u> | <u>737</u> | 918 | 731 | 910 | 738 |
| 456.hammer | 64 | 1112 | 537 | <u>1115</u> | <u>536</u> | 1115 | 536 | 64 | <u>669</u> | <u>892</u> | 663 | 900 | 673 | 887 |
| 458.sjeng | 64 | 1277 | 607 | <u>1269</u> | <u>610</u> | 1269 | 610 | 64 | 1156 | 670 | 1165 | 665 | <u>1158</u> | <u>669</u> |
| 462.libquantum | 64 | 2161 | 614 | <u>2169</u> | <u>611</u> | 2173 | 610 | 32 | 1051 | 631 | <u>1054</u> | <u>629</u> | 1057 | 627 |
| 464.h264ref | 64 | 1882 | 753 | 1938 | 731 | <u>1899</u> | <u>746</u> | 64 | <u>1774</u> | <u>798</u> | 1802 | 786 | 1772 | 799 |
| 471.omnetpp | 64 | <u>1709</u> | <u>234</u> | 1711 | 234 | 1709 | 234 | 64 | 1677 | 239 | <u>1671</u> | <u>239</u> | 1668 | 240 |
| 473.astar | 64 | 1133 | 397 | 1129 | 398 | <u>1131</u> | <u>397</u> | 64 | <u>1072</u> | <u>419</u> | 1073 | 419 | 1066 | 422 |
| 483.xalanbmk | 64 | 752 | 587 | <u>753</u> | <u>587</u> | 753 | 586 | 64 | 713 | 619 | 710 | 622 | <u>712</u> | <u>620</u> |

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

Peak Tuning Notes

```

fdpr binary optimization tool used for:
400.perlbench
  with options -O4 -omullX for optimization phase,
  and -imullX for instrumentation phase.
401.bzip2
  with options -O4 -vrox
403.gcc
  with options -O4 -nodp -rtb
429.mcf 445.gobmk 458.sjeng 473.astar
  with options -O3
456.hammer
  with options -O4 -nodp -m power7
462.libquantum
  with options -O4 -vrox -nodp
464.h264ref
  with options -O4 -vrox -nodp -rtb
471.omnetpp
  with options -O3 -lu -1 -nodp -sdp 9
483.xalanbmk
  with options -O3 -m power7

```

Submit Notes

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



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Operating System Notes

```
ulimit -s (stack) set to 1048576.  
Large pages reserved as follows by root user:  
echo 3520 > /proc/sys/vm/nr_hugepages  
The following environment variables were set before the runspec command:  
export XLFRTLOPTS=intrinths=1  
export HUGETLB_VERBOSE=0  
export HUGETLB_MORECORE=yes  
export HUGETLB_ELFMAP=RW
```

Base Compiler Invocation

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

Base Portability Flags

```
400.perlbench: -DSPEC_CPU_LINUX_PPC  
462.libquantum: -DSPEC_CPU_LINUX  
464.h264ref: -qchars=signed  
483.xalancbmk: -DSPEC_CPU_LINUX
```

Base Optimization Flags

```
C benchmarks:  
-O5 -qarch=pwr7 -qtune=pwr7 -qalias=noansi -qalloca -lhugetlbfs  
  
C++ benchmarks:  
-O5 -qarch=pwr7 -qtune=pwr7 -qrtti -lsmartheap
```

Base Other Flags

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



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Peak Compiler Invocation

C benchmarks:

xlC -qlanglvl=extc99

C++ benchmarks:

xlC

Peak Portability Flags

400.perlbench: -DSPEC_CPU_LINUX_PPC
462.libquantum: -DSPEC_CPU_LINUX
464.h264ref: -qchars=signed
483.xalancbmk: -DSPEC_CPU_LINUX

Peak Optimization Flags

C benchmarks:

400.perlbench: -Wl,-q -qpdf1(pass 1) -qpdf2(pass 2) -O4 -qarch=pwr7
-qtune=pwr7 -qalias=noansi -qipa=level=2 -lsmartheap
401.bzip2: -Wl,-q -qpdf1(pass 1) -qpdf2(pass 2) -O3 -qarch=pwr7
-qtune=pwr7 -lhugetlbfs
403.gcc: -Wl,-q -qpdf1(pass 1) -qpdf2(pass 2) -O4 -qarch=pwr7
-qtune=pwr7 -qalloca -lhugetlbfs
429.mcf: -Wl,-q -O5 -qarch=pwr7 -qtune=pwr7 -lhugetlbfs
445.gobmk: -Wl,-q -qpdf1(pass 1) -qpdf2(pass 2) -O4 -qarch=pwr7
-qtune=pwr7 -lhugetlbfs
456.hmmer: -Wl,-q -O5 -qarch=pwr7 -qtune=pwr7 -qsimd
-qassert=refalign -qipa=inline=threshold=2888
-qipa=inline=limit=11880 -lhugetlbfs
458.sjeng: -Wl,-q -qpdf1(pass 1) -qpdf2(pass 2) -O5 -qarch=pwr7
-qtune=pwr7 -lhugetlbfs
462.libquantum: -Wl,-q -qpdf1(pass 1) -qpdf2(pass 2) -O5 -qarch=pwr7
-qtune=pwr7 -q64 -lhugetlbfs
464.h264ref: Same as 458.sjeng

C++ benchmarks:

Continued on next page



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Peak Optimization Flags (Continued)

471.omnetpp: -Wl,-q -qpdf1(pass 1) -qpdf2(pass 2) -O5 -qarch=pwr7
-qtune=pwr7 -qrtti -lsmartheap

473.astar: -Wl,-q -qpdf1(pass 1) -qpdf2(pass 2) -O4 -qarch=pwr7
-qtune=pwr7 -lhugetlbfs -lsmartheap

483.xalancbmk: -Wl,-q -O5 -qarch=pwr7 -qtune=pwr7 -lsmartheap

Peak Other Flags

C benchmarks:
-qipa=threads

C++ benchmarks:
-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.20100901.html>

You can also download the XML flags source by saving the following link:

<http://www.spec.org/cpu2006/flags/IBM-Linux-XL.20100901.xml>

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

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